



ACCESSIBLE COMMUNITIES ANALYSIS



AMERICAN
PRINTING
HOUSE



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“ No one wants to wait for assistance to get where they need to go. If we are going to create a world that belongs to everyone, we have to continue breaking down barriers to independence. APH created Nearby Explorer to work as digital signage that can tell users who are blind or visually impaired where they are each step of the way. ”

Craig Meador, APH President

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SECTION I

EXECUTIVE SUMMARY

A. Introduction

The American Printing House for the Blind (APH) documented the perceptions and experiences of people with vision loss regarding accessible, livable communities in the summer of 2017. Through in-person interviews and an online survey, APH staff gathered usable feedback from hundreds of individuals throughout the United States and beyond. In this report, sample groups, methodology and overall survey findings are described. Appendix 1 contains statistical tables that support this analysis and report.

There is no standard definition of the size of a community or the extent to which



one community, such as a suburban neighborhood, may overlap or be inclusive of another. Communities include towns, neighborhoods, cities, or urban areas where people live and work. The terms accessible and livable loosely describe communities in which people living with blindness, low vision, or other disabilities are able to enjoy the spaces and have the opportunities to pursue activities that make their lives meaningful and enjoyable.

B. Survey Methodology

The motive for this data collection effort was two-pronged: first, to help APH select the most important locations for independent, indoor navigation, which would be mapped for the Nearby Explorer app; and second, to support APH's organizational vision of making Louisville the most accessible U.S. city. The methodology is outlined below.

A team was assembled, the Accessible Cities Committee, and was tasked with attending three national conferences, American Council of the Blind (ACB), National Federation of the Blind (NFB), and Association for Education and Rehabilitation of the Blind and Visually Impaired International Orientation and Mobility (AER-O&M) and interviewing people with visual impairments as well as family members and other community stakeholders. Because of the timing of the conventions we, the Committee, only had a few weeks to develop the questions and the data collection strategy. After these conferences, which were held in the summer of 2017, we concluded we should also collect data locally. In November, we conducted interviews at the annual meetings of the Kentucky chapters of ACB and NFB. That Louisville and Kentucky-specific data has been combined with the national data throughout this report.

The interviews served both as a data collection tool, but also as a way to introduce people to our online survey. Knowing it would be challenging to engage with people at the conferences for more than a couple of minutes, we decided to limit the in-person interview to three to four questions and then direct interviewees to the longer online survey. The online survey was also advertised on social media and the APH website. We do not know how many people completed both the in-person interview and the online survey, but we are certain there is overlap between the two groups. Note: the online survey was only open during July and August, meaning it was not available to the people interviewed at the Kentucky meetings in November.

Before we crafted our questions, we determined six categories to represent types of locations and experiences that may pose accessibility challenges. We took a list of potential accessibility projects compiled by APH staff, which had been sorted into themes, and combined those themes until we had narrowed the list to six. The final categories we settled on were Transportation/Travel, Entertainment, Public Buildings, Parks/Recreation, Workplace/Daily Living, and Shopping.



Survey Covered Six Categories

- Transportation/Travel
- Entertainment
- Public Buildings
- Parks/Recreation
- Workplace/Daily Living
- Shopping

We wanted to collect data in all six categories without having to ask interviewees too many questions, so we designed the first interview question for the national conference interviews as a scenario-based question with six interchangeable locations, one for each category. The six possible locations were a bus/train station, a baseball game, a courthouse, a hospital, a park, and a grocery store. The interviewers rotated through the locations to ensure we received an approximately equal distribution of responses across the categories.

For the second question, we listed the same six categories and asked the interviewee to choose the category they felt was the highest priority for accessibility improvements in their city. Once they chose a category, we asked them to give one specific improvement their city could make in that area. For the third question, there were two possible options to ask the interviewee: “What are the greatest barriers to accessibility in your city?” or “What makes a city fully accessible?” As we developed the survey, we designed these two questions as different ways of arriving at similar information: the first question asks people to point out negative circumstances in their city, and the second asks people to construct a positive ideal. Each interviewee was asked only one of these questions. As interviewers, we used the interviewee’s previous responses to determine which framing question to ask. If they seemed relatively happy with accessibility in their city, we would ask the second question; if they seemed like they had a lot to say about their city’s shortcomings, we would ask the first.

“ What are the greatest barriers to accessibility in your city? ”

Note that there are a few key differences between the interview questions asked at the national conferences and Kentucky chapter conferences. After looking through the data from our national conference interviews, we realized we needed to remove Transportation/Travel as an option in question two because, as it was by far the highest priority for accessibility improvements, it would prevent us from getting information on the other five categories during our Kentucky interviews. We chose to pull Transportation/Travel from question two and instead wrote a transportation-specific question to replace question one from the national conference interviews. Question one for our Kentucky interviews listed a series of types of transportation (paratransit, rideshare, etc.) and asked the interviewee which they used, followed by asking them for an improvement they would like to see for one of the transportation types they selected. We also added an additional question about internet availability and affordability in Kentucky because that could guide some of the projects or partnerships APH decides to pursue locally.

The online survey questions were informed by the same six categories used in the interviews. Each survey taker received nine questions. Like with the Kentucky conference interviews, we decided to pull the Transportation/Travel category out and ask separate questions about it first. After asking them to identify their city and tell us how accessible they feel it is, from “not at all” to “highly,” we asked them to select all of the types of transportation they use, and then to tell us about the accessibility of that transportation, from pedestrian walkways to metro systems.

In question five we asked survey takers to rank the other five categories—Entertainment, Public Buildings, Parks/Recreation, Workplace/Daily Living, and Shopping—in terms of highest accessibility priority. After that, each survey taker randomly received a series of three questions about one of those five categories. Our goal was to collect information on every single category, rather than just the ones that emerged as the highest priorities. The questions were a mix of multiple choice and open response. Questions in this section ranged from “What type of store would you consider to be the highest priority for independent navigation?” to “What, if any, accessibility challenges did you face when obtaining a government-issued I.D.?”

The final question, which everyone received, was an optional open response: “Imagine you’ve been given an unlimited budget to improve accessibility in your community. What changes would you make?” We encouraged survey takers to consider top priorities and to be as detailed and specific as possible. This is a slightly different framing from the last question in our in-person interviews, “What are the greatest barriers to accessibility in your city?” or “What makes a city fully accessible?” We were hoping to prompt people to be more creative in their written responses.

“ Imagine you’ve been given an unlimited budget to improve accessibility in your community. What changes would you make? ”

Lastly, we retained the research services of TheAmerican Foundation for the Blind (AFB) to analyze the data collected by APH. They completed both qualitative and quantitative analysis and were not involved in the survey or data collection methodologies. The AFB research team used the Dedoose qualitative analysis software to analyze the survey information. They combined qualitative responses from all three research phases into one qualitative dataset to identify themes across the three data sources.

C. Breakdown of Survey Respondents Included in the Analysis

- Total in-person interviews held at the American Council of the Blind (ACB), National Federation of the Blind (NFB), and Association for Education and Rehabilitation of the Blind and Visually Impaired International-Orientation and Mobility (AER-O&M) conventions with participants from the United States and from other countries: 398
- Total in-person interviews held in the Louisville, Kentucky-Indiana MSA and Non-MSA areas: 51
- Total in-person respondents: 449
- Total online respondents nationwide and from other countries: 522
- Total in-person and online responses (representing all 50 U.S. states, the District of Columbia, Puerto Rico, U.S. Virgin Islands and other countries): 971



Note: Not all survey participants answered all survey questions. Therefore, the total number of responses varies from question to question.

D. Highlights of Key Survey Questions and Results from the Three Survey Groups

Highlights of In-Person Interviews at ACB, NFB, and AER-O&M Conventions

APH staff conducted interviews with attendees of the 2017 American Council of the Blind (ACB), National Federation of the Blind (NFB), and Association for Education and Rehabilitation of the Blind and Visually Impaired International-Orientation and Mobility (AER-O&M) national conventions. Interviewers asked respondents to select one of the following six categories that they think is their highest priority for improvements in accessibility:

- Entertainment
- Parks/Recreation
- Public Buildings
- Shopping
- Transportation/Travel
- Workplace/Daily Living

About two-thirds (64%) of respondents overwhelmingly chose Transportation/Travel as their first-choice priority for improvements in accessibility, with Shopping coming in at 15% as their second highest priority for improvements in accessibility.

Highlights of the Louisville Area In-Person Interviews

Fifty-one survey participants in the Louisville area were asked to list which of the seven forms of transportation they use where they live:

- Almost all respondents (92%) reported being driven by someone they know.
- Three quarters of all respondents use paratransit services as their form of transportation.
- Of all respondents, about two-thirds indicated they use each of these modes: Walk on sidewalks, rideshare, and public transportation.
- Fifty percent (50%) of Louisville residents and 69% of those outside of Louisville use taxis.

Because the category of Transportation was asked about in a separate question, Louisville respondents were asked to answer which of five remaining categories are their highest priority for improvements



in accessibility in their communities. Shopping was selected as the top priority by 43% of Louisville respondents, followed by Workplace/Daily Living at 18%.

Respondents were asked whether they were satisfied with the availability and affordability of Internet access in their communities. About 45% are satisfied and 47% are not satisfied.

Highlights of the Online Survey

There were 522 online respondents from all states except for Alaska, Hawaii, and Nevada. Responses were also received from Washington, DC, Puerto Rico, the U.S. Virgin Islands, Australia, Denmark, and Qatar. A majority of the respondents came from California (56), Kentucky (49), and Texas (34). We received an average of 11 responses per state, with a median of eight responses.

Overall Accessibility of Cities

Online respondents were asked to rate the overall accessibility of their cities, considering the same six categories used for the in-person interviews at the national conferences—Transportation, Entertainment Venues, Public Buildings, Workplaces, Parks, and Shopping Centers. Forty percent (40%) rated their cities as somewhat accessible, and 32% rated them as mostly accessible, a total of 72% combined. Only 8% rated their cities as highly accessible.

**“ Only 8% rated
their cities as
highly accessible. ”**

When respondents were asked to rank what priority they would give to improving accessibility in five categories (Workplace/Daily Living, Public Buildings, Shopping, Entertainment, and Parks/Recreation), they clearly favored giving priority to Workplace/Daily Living with 47% choosing it as their highest priority. About half of the respondents chose Public Buildings and Shopping as their second and third priorities.

Additionally, respondents were asked to rate the importance of green space for guide dogs in the community. Most of the respondents who answered found the presence of green space to be highly or fairly important (42%) or were neutral (41%).

Transportation

Respondents were asked to select the modes of transportation they use most often; they mentioned an average of three types:

- Two-thirds of respondents indicated that they walk.
- Over half said they use ridesharing options or ride buses.
- A quarter or fewer of all respondents reported using taxis, trains, or subway systems.

Regarding public transportation infrastructure, respondents were asked, “Is/are the public transportation center(s) in your community accessible?”

- Of 80 respondents, 53% reported that public transportation centers in their communities are accessible.
- About 26% reported that they are inaccessible.

Public Buildings

When asked, “Which public building would be most important to be able to navigate independently,” 36% of the 81 respondents who answered selected government buildings as the most important.

Shopping

When asked to select the highest priority for independent navigation among several types of stores, the majority (57%) of the 98 respondents said that grocery stores were the highest priority.

Respondents were also asked to report their ability to navigate to and around the stores they need:

- Seventy-seven percent (77%) reported that their transit service currently provides access to shopping areas.
- Almost two-thirds (62%) reported that navigation or other accessibility challenges prevent them from shopping independently.

Recreational Facilities

Respondents had a variety of concerns about accessible recreational facilities. Findings include:

- Tactile maps and braille signage could be improved in city parks.
- Respondents requested audio description, staff training, and braille signage in museums.

Medical Facilities

When asked about accessibility of medical facilities:

- Forty-one percent (41%) of the 90 respondents reported visiting a medical facility that they could not navigate independently.
- A nearly equal percentage (38%) reported not having problems.

Internet Access

When asked about their ability to access affordable, quality Internet at home, almost half of 83 respondents can access affordable, quality Internet at home. The remainder can access it elsewhere (library, school, or workplace).

E. Summary of Qualitative Findings and Recommendations

We analyzed the qualitative data from the surveys and interviews by combining responses from all three research phases into one qualitative dataset and identified themes across the three data sources. The diversity of the vision loss population must be considered when analyzing aspects of community livability and accessibility. Vision loss impacts people of all ages, skills, levels of adjustment to blindness, life experiences and cultural backgrounds. Some may use a white cane, a guide dog, or human assistance, which may impact their need for assistance and accessibility. Participant comments reflected the fact that community accessibility may be experienced and perceived differently by residents with different attitudes and characteristics. Included among the participants were people, both professional and nonprofessional, who work with or assist individuals with some level of vision loss.



Inclusive Values

Respondents stressed that certain values were essential to making a community most desirable, including equality of opportunity and cultural awareness, a commitment to accessibility that went beyond requirements of the Americans with Disabilities Act (ADA), and a willingness to collaborate with blind and visually impaired residents.

Walkable Neighborhoods

Respondents said that walkable and navigable neighborhoods, which included wide, smooth sidewalks free of obstructions, and shopping and entertainment near the respondents' homes, were key ingredients to an accessible community. In particular, sidewalks connecting streets to the entrances of shops and businesses (not requiring pedestrians to navigate through parking lots to reach their destinations) were a major concern. Respondents advocated for detectable warnings at busy intersections that would steer a pedestrian safely across an intersection rather than diagonally into the street. Audible pedestrian signals (APSS) would provide the pedestrian with clear information about when it is safe to cross, participants said.

Transportation

As expected, respondents had extensive comments about transportation, including bus, paratransit, taxis and private on-demand services like Uber and Lyft.

“Transportation services should be accessible, affordable and reliable, easy to use and readily available.”

Transportation services should be accessible, affordable and reliable, easy to use and readily available. Respondents asked that paratransit systems have flexible policies that would enable riders to travel in a variety of situations and attend the same plethora of venues as their sighted colleagues. They asked for clear, sufficiently loud, accurate, automated announcements on public vehicles and in stations and terminals, beacons at bus stops and in large terminals, and information made available through accessible smartphone apps that would make travel easier for them.

Access to Information

People with visual impairments have a range of preferred methods for accessing information, but they almost all share the experience of not having sufficient access to desired and/or necessary information in their communities, whether on street signs, in shopping malls, or in a government office building. Lack of information impacts access to almost all community spaces, and respondents frequently mentioned the basic problem of identifying who and/or what is in their vicinity or elsewhere in their community. Respondents most often mentioned braille, but they also requested signage in large, high-contrast print, as well as audio materials, which can often be made available through modern assistive technology such as using an app with a smartphone.

“ Respondents wished that public spaces were designed in compliance with the ADA. ”

Public Spaces

Finally, respondents wished that public spaces were designed in compliance with the ADA. They said that sighted assistance should be provided when requested as it is sometimes required, even for the most independent blind residents. They stressed that livable communities should include access to affordable housing in safe neighborhoods adjacent to employment, shopping and recreational activities.

F. Programs and Solutions Proposed and/or Implemented to Support Accessible Communities

Recommendations to improve accessible, livable communities are provided in Section II-D of the full report. As much as possible, the recommendations are direct quotes from the respondents. The recommendations are organized and presented into the following categories:

- **Promote Change.** Respondents suggested organizing community advocates, leaders, and coalitions to encourage accessibility in the community. They suggested forming coalitions across county lines to



improve transportation, collaborating with like-minded nonprofit agencies, and working with small businesses to promote accessibility.

- **Make Information Accessible.** Government documents and websites should comply with existing access standards and tactile city maps should be available upon request.
- **Change Attitudes.** Respondents suggested implementing universal design principles and, in some instances, going beyond requirements of the Americans with Disabilities Act (ADA).
- **Offer New and Improved Services.** Respondents advocated for additional assistance with shopping through volunteer programs; specialized programming for individuals with disabilities such as touch tours, tandem biking, and accessible fitness centers; and mentors for newly blinded individuals or young blind people. They also advocated for training in mobility, independent living and technology for people with vision loss.
- **Explore New and Improved Technologies.** Participants suggested indoor and outdoor wayfinding devices with braille output, use of self-driving vehicles for paratransit services and increased availability of human assistance through apps such as AIRA.
- **Change Policies and Increase Funding.** Incentives and training for business to become more accessible, awareness training for staff in public places, enforcement of traffic laws, and use of taxis and on-demand services for paratransit were suggested.
- **Implement Systems Changes.** Respondents suggested enforcement of access laws and increased employment opportunities for people who are blind through employer education, job developers at rehabilitation agencies and increased telecommuting options.



SECTION II

METHODOLOGY AND FINDINGS

A. Sample Groups and Methodology

We begin with a brief description of the samples and data collection methods, and then follow with the quantitative data from the in-person interviews, Louisville survey, and the national online survey. We then present the qualitative data from all three rounds of data collection and close with a summary of the recommendations respondents made to improve the accessibility of their cities. Appendix 2 presents data from the surveys and recommendations from the respondents in their own words.



The researchers conducted the survey in three phases:

- An in-person survey was conducted with 398 attendees of the 2017 conventions of the American Council of the Blind (ACB), National Federation of the Blind (NFB), and Association for Education and Rehabilitation of the Blind and Visually Impaired International-Orientation and Mobility (AER-O&M).
- Interviewers asked 52 individuals questions about accessibility in the Louisville, Kentucky, community. Responses were divided into two geographic areas based on whether the respondent's zip code fell within or outside of the Louisville-New Albany or the Kentucky-Indiana Metropolitan Statistical Area (MSA). Thirty-eight respondents indicated that they live within the Louisville-New Albany MSA and 13 respondents indicated that they live elsewhere.
- Researchers distributed the online survey information at national conferences and on social media, with 19 sets of questions related to a variety of topics about accessibility in their communities. Of the 535 responses, 13 were excluded as duplicate or substantially incomplete, leaving 522 responses. Because most of the remaining responses included one or more unanswered questions, we provide the total number of responses for each question.

B. Quantitative Findings

In-Person Survey at Conventions

APH staff conducted interviews with 398 attendees of the 2017 ACB, NFB, and AER-O&M national conventions. Interviewers asked respondents to select one of the following six categories that they think is their highest priority for improvements in accessibility:

- Entertainment
- Parks/Recreation
- Public Buildings
- Shopping
- Transportation/Travel
- Workplace/Daily Living



Following are the survey results from all the in-person interviews at the conventions:

Sixty-four percent (64%) of respondents (253 of 398) overwhelmingly chose Transportation/Travel as their first-choice priority for improvements in accessibility, with Shopping coming in as the second highest priority at 15% (58 of the 398 respondents). Workplace/Daily Living was selected as the third priority by 29 of the 398 respondents, or 7% (Appendix 1: Table 1).

When asked to specifically name a second priority, 53% (10 of 19) of the convention attendees chose

Shopping, with the remainder of the second choices nearly evenly spread across the other categories (see Appendix 1: Table 2).

Louisville Area Interviews

Interviewers included responses from 51 survey participants in the Louisville, Kentucky, area who were asked about accessibility in their community. The first question asked respondents to list which of the seven forms of transportation they use where they live (Appendix 1: Table 3):

“ On average, all respondents indicated using between four and five forms of transportation. ”

- Almost all (92%) respondents reported being driven by someone they know.
- Seventy five percent (75%) of all respondents use paratransit systems.
- Of all respondents, 59% to 69% indicated they also use sidewalks, rideshare, and public transportation, and those in Louisville are more likely to use these transportation modes than those who live outside of the Louisville area.
- Half of Louisville residents and 69% of those outside of Louisville use taxis, respectively.
- Among all Louisville respondents, bikes are the least used form of transportation, at 4%.
- On average, all respondents indicated using between four and five (4.16) forms of transportation
- Next, Louisville respondents were asked to answer which of the five categories they consider as their highest priority for improvements in accessibility in their communities. The ranking came in as follows (Appendix 1: Table 4):
 - Shopping—43%
 - Workplace/Daily Living—18%
 - Parks/Recreation—14%
 - Entertainment—10%
 - Public Buildings—12%
 - No Response—4%.

A similar percentage of Louisville and non-Louisville residents chose shopping as their highest priority (42% and 46% respectively) (Appendix 1: Table 4).

Fifty-one (51) respondents were asked whether they were satisfied with the availability and affordability of Internet access in their communities. Twenty-three of the 51 (45%) are satisfied and 24 (47%) are not satisfied. Following are the responses broken down by geographic area (Appendix 1: Table 5):

- Satisfied: 42% of Louisville residents; 54% of non-Louisville residents
- Unsatisfied: 53% of Louisville residents; 31% of non-Louisville residents

National Online Survey

Five hundred twenty-two (522) online respondents were included in the survey results. Data is from all states except for Alaska, Hawaii, and Nevada. We also received responses from Washington, DC, Puerto Rico, the U.S. Virgin Islands, Australia, Denmark, and Qatar. A majority of the respondents came from California (56), Kentucky (49), and Texas (34). We received an average of 11 responses per state, with a median of 8 responses. Nine respondents did not provide their location.

Online respondents were asked to rate the accessibility of their cities, considering the following six categories:

- Transportation
- Entertainment Venues
- Public Buildings
- Workplaces
- Parks
- Shopping Centers

Following is how respondents rated the accessibility of their cities, excluding non-responses:

- A total of 202 respondents (40%) rated their cities as somewhat accessible and 162 respondents (32%) rated them as mostly accessible, a total of 72% combined.
- Only 8% rated their cities as highly accessible.
- Just 6% rated their cities as not at all accessible.

The responses suggest that those surveyed generally believe their cities are reasonably accessible but there is room for improvement (Appendix 1: Figure 1).

Asked to rank what priority they would give to accessibility improvements in five categories –

Workplace/Daily Living, Public Buildings, Shopping, Entertainment, and Parks/Recreation—respondents clearly favored giving priority to Workplace/Daily Living with almost half (47%) choosing it as their highest priority, and about half of the respondents chose Public Buildings and Shopping as second and third priorities. Entertainment and Parks/Recreation were the lowest priorities (Appendix 1: Table 6).

Additionally, respondents were asked to rate the importance of green space for guide dogs in the community. While it is unknown what percentage of respondents were guide dog users, most of the respondents who answered found the presence of green space to be highly or fairly important (42%) or neutral (41%) (Appendix 1: Table 7).

Transportation

Respondents were asked to select the modes of transportation they use most often. They mentioned an average of three types (Appendix 1: Table 8):

“Two-thirds of respondents indicated that they walk.”

- Two-thirds of respondents indicated that they walk.
- Over half said they use ridesharing options or ride buses.
- A quarter or fewer of all respondents reported using taxis, trains, or subway systems.
- Almost half of respondents also report using another unspecified form of transportation.
- Focusing on the public transportation infrastructure, respondents were asked, “Is/are the public transportation center(s) in your community accessible?” (Appendix 1: Table 9)
- Of 80 respondents, 42 (53%) reported that their public transportation centers are accessible.
- Twenty-one (21) (26.25%) reported that they were inaccessible.
- The rest reported that they either did not know, or the question was not applicable.

Public Buildings

When asked, “Which public building would be most important to you to be able to navigate independently?” (Appendix 1: Table 10)

- Over 1/3 (29 of 81) of the respondents selected government buildings.
- Just over 20% selected some other unspecified building.
- The rest selected the library, post office, and community center.

Shopping

When asked to select the highest priority for independent navigation among several types of stores, the majority of respondents said that grocery stores were the highest priority. Of the 98 respondents who answered this question, 57% considered grocery stores their highest priority. Less than one-fifth of respondents selected big box stores, shopping malls, independent retailers or other stores (Appendix 1: Table 11).

Respondents were also asked to report their ability to navigate to and around the stores they need. Over three fourths (77%) reported that their transit service currently provides access to shopping areas, but almost two-thirds (62%) reported that navigation or other accessibility challenges prevent the respondents from shopping independently (Appendix 1: Table 12).

“ The majority of respondents said that grocery stores were the highest priority. ”

Recreational Facilities

Respondents had a variety of concerns about accessibility of recreational facilities. Findings include (Appendix 1: Tables 13–15):

- Tactile maps and braille signage could be improved in city parks.
- Respondents requested audio description, staff training, and braille signage in museums.

- Only 18% of the 102 respondents to a question about fitness centers thought they were accessible, and 25% said they were inaccessible.

Medical Facilities

When asked about accessibility of medical facilities, 41% (38 of 92 respondents) reported visiting a medical facility that they could not navigate independently, and a nearly equal percentage (38%) reported not having problems (Appendix 1: Table 16).

Internet Access

When asked about their ability to access affordable, quality internet, almost half (39 of 83 or 47%) can access affordable, quality internet at home and the remaining 44 respondents (53%) can access it elsewhere (library, school, workplace) (Appendix 1: Table 17.).

C. Qualitative Findings

The diversity of the population must be considered when analyzing aspects of community livability and accessibility as well as the values and priorities of people with vision loss. Vision loss impacts people of all ages. Some programs and services are designed to benefit specific age groups (school children, working-age people, retirees and senior citizens); therefore, different residents may experience and perceive community accessibility differently. Different life experiences, cultural backgrounds, and personality traits mean that everyone experiences the continuums of accessibility and livability differently. The experiences of people who are newly visually impaired may be different from those who have had more time to adjust. Additionally, older people with recent vision loss may adjust differently from those with vision loss at birth or when they are young. Presence of other disabilities or health factors may also affect the person's adjustment and how they experience the community. Differences in educational backgrounds and how recently the person lost vision lead to a diversity of knowledge and skills among individuals who are adapting to vision loss. Abilities may vary widely in individuals' orientation and mobility skills and training, in their self-advocacy and social skills. They may have family responsibilities, such as caring for elderly parents or children, and may have differing skills in using a smartphone or other technology. Finally, some may use a white cane, a guide dog, or human assistance, which will impact their need for assistance and accessibility.



“ Different residents may experience and perceive community accessibility differently. ”

The analysts at AFB used the Dedoose qualitative analysis software to analyze the qualitative data from the surveys and interviews. They combined qualitative responses from all three research phases into one qualitative dataset and identified themes across the three data sources. This strategy strengthened the credibility of the findings as all three data sources supported major themes. In this section, we describe the following:

- What values make a community livable, including a general commitment to accessibility and cultural diversity
- What qualities make a community livable, including walkable and navigable neighborhoods, transportation, access to information, independent navigation in public spaces, available assistance and housing.
- Programs and solutions proposed and/or implemented to support accessible communities

Listed below are aspects of each area that were important to respondents.

What Values Make a Community Livable?

This segment looks at themes among the values and preferences shared by survey and interview respondents, highlighting some of the most important concepts for approaching community-wide planning of accessibility and livability.

Equality of Opportunity and Cultural Awareness

The attitudes of the sighted public as well as city or town leaders were noted as important factors in community access. One respondent said, “In a fully accessible city, a person with visual impairment would have equal opportunity to everything everyone else does.”

Participants mentioned the need for greater awareness of the abilities and potential of people with vision loss. They also expressed the need for awareness of existing laws and policies related to accessibility. Several participants mentioned the concept of universal design, reflecting the need for city planning and infrastructure design that incorporates features that work for everyone.

An interviewee explained, “People have a limited view of accessibility depending on their own experience,” and that for a city to be fully accessible, “all sorts of accessibility must be considered.” A respondent described a situation in which “audible signals at intersections are not installed two years past promised dates.”

An attitude of helpfulness and openness to diversity from the public were considered key to a livable community. One respondent asked, “What is the heart or conscience of a community, a hand up or hand out?” In other words, do people with disabilities feel a part of a collaborative effort, or are they viewed as passive recipients of charity or public assistance? A community attitude of interdependence promotes participation and equality for people with visual impairments.

“ In a fully accessible city, a person with visual impairment would have equal opportunity to everything everyone else does. ”

Positive and Negative Community Values

People who are blind or visually impaired want to know that accessibility and commitment to accessible design in their communities is a priority, and that the community intentionally makes efforts to be accessible. They want the opportunity to make the same daily decisions as anyone else—the ability to go where they want to go, when they want to go, with or without assistance, whether to fulfill a “want” or a “need.” One participant was pleased to report, “I have bus transportation from my home to the downtown area until after midnight each day. I can take a bus to town and walk over a bridge to take in a major league baseball game. . . I can get to theaters for plays on public transportation, but I can also use Uber or paratransit if they fit my needs better.”

“ They want the opportunity to make the same daily decisions as anyone else. ”

Participants felt more positive when city leaders were willing to work with the blindness community to improve accessibility in their area. One respondent said, “Street crossings are becoming more and more accessible; traffic engineers are working with orientation and mobility specialists and have a greater awareness of such needs.” Others were hopeful that improvements in the community, such as a “complete streets” policy and improvements in theaters were on the way.

Negative characteristics of communities or programs that inhibited accessibility and livability included expense of taxis, lack of commitment to safe pedestrian crossings with curb cuts and detectable warnings, lack of commitment to ADA enforcement, lack of services in smaller communities and reduced quality of transit systems over time.

What Qualities Make a Community Livable?

Walkable and Navigable Neighborhoods

Several participants commented on the extent to which their community was “walkable,” factoring in characteristics ranging from the distance between destinations to the presence of sidewalks, highways, and steep hills. Walkable neighborhoods have wide and smooth sidewalks and key destinations close to the individuals’ residence. An online survey respondent wrote, “Cambridge, and by extension, Boston, is a city that is old. As a result, the sidewalks and the streets are uneven, irregularly set up.”

Respondents also said it was helpful to have cities designed with intermixed “live-work-play” neighborhoods, where residents can easily find entertainment, shopping, employment, and housing within a few-block radius. An online respondent wrote that it was “nice having a lot within downtown, which is easy to walk through.” Survey respondents had positive comments about the grid-system of streets in Chicago and Louisville.

Sidewalks are perhaps the most important pedestrian paths—they were certainly the most mentioned in this study—although communities do not always ensure that sidewalks are sufficient and useable. Survey and interview participants advocated for sidewalks on both sides of every street as well as sidewalks that connect streets to the entrances of shops and businesses so that pedestrians are not required to navigate through parking lots to reach their destinations. Broken, cracked

“ Broken, cracked sidewalks or those that hold water must be repaired. ”

sidewalks or those that hold water must be repaired, and pedestrians should be provided with clear and easy means of reporting sidewalks in need of repair and requesting new sidewalks wherever needed. Participants mentioned the need for sidewalks to have curbs that are steep enough to be noticed but not so high as to require steps or be otherwise dangerous. Sidewalks should also be safely separated from roadways wherever possible.

Communities must be aware of and seek to reduce obstacles in sidewalks and other pathways. The survey participants and interviews described a host of potential obstacles, including plants and debris, flowerbeds, garbage cans, bushes and trees, poles, potholes, unshoveled snow and snow piles in the crosswalk. One survey respondent suggested that communities should “implement a notification-based service that would provide notifications such as construction obstructions and other obstacles.”

Bike paths may provide additional access for pedestrians as long as rules about safety and sharing space are enforced. Bicyclists on sidewalks must also follow rules to safely avoid colliding with pedestrians. In addition, drainage and storm sewage systems must be maintained and improved to prevent ditches and runoff from flooding into pedestrian paths.

Along with walkways, intersections where pedestrians encounter traffic can pose significant challenges. Smaller towns and less walkable communities may have few or no lighted or marked intersections for safe street crossing by pedestrians. Where these intersections exist, their characteristics can help or hinder pedestrians who are blind or visually impaired. At a minimum, lighted intersections with pedestrian crossings should provide enough time for pedestrians to safely cross the given street. For people with low vision, the visual signal should be operational with high-contrast. For people who cannot use visual information to cross the street, audible pedestrian signals (APSs) should be installed to provide the pedestrian with clear information about when it is safe to cross.

Respondents described a variety of aspects of APS devices that make them more or less helpful. The button on the APS should be easily located in a standard position at the intersection and at a height that can be reached by someone in a wheelchair. Locator tones can be useful for pedestrians trying to find the APS button. For people who are deafblind, the signal should provide haptic or tactile information in addition to the auditory feedback. Some respondents prefer speaking rather than chirping or beeping signals (especially speaking the name of the street to be crossed); some desire APSs that are subtler or less intrusive to others in the area, and several respondents reported a desire for uniformity or standardization of APSs within a community.

In addition to APSs at intersections, pedestrians with vision loss need curb cuts that are well-marked and steep enough to clearly indicate that the person is stepping into a street or parking lot. Truncated domes or detectable warning systems that are placed in crosswalks signal to pedestrians that they are approaching a crossing or intersection. Access and safety are increased when curb cuts and other indicators are aligned to direct pedestrians directly across a street and up the curb cut onto the sidewalk on the opposite side; unfortunately, many of these curb cuts and indicators do not provide sufficient direction or, even worse, point pedestrians directly into the middle of intersections.

Parking lots were the subject of many complaints from survey and interview participants. While these lots provide access for drivers to shops and businesses, they often form vast, dangerous “no-man’s lands” between sidewalks or bus stops and the desired destinations of walkers with vision loss. One respondent explained, “The bus, in some cases, does not take you directly to the building; rather, the buses take us somewhat close, but we, as blind individuals, will still need to go through very complex and huge parking lots just to get to the building.”

Planners should reconsider or plan very carefully the use of roadways and sidewalks that merge into shared-use paths in the newly popular plazas and cityscapes; there are few curbs to delineate safe

pedestrian walkways for people with vision loss. Participants shared that five-street intersections, fast-moving traffic, and roundabouts can be especially challenging, and so special care should be taken to consider ways to facilitate safe crossing for pedestrians.

Finally, communities must educate drivers and enforce traffic laws with respect to pedestrians, white canes, and intersections. Certain traffic rules and designs—such as right turns on red, flashing yellow lights, and right turns on green arrows—can make street crossings particularly difficult for pedestrians who are listening for sounds of moving traffic to determine if it is safe to cross a street. In these cases, drivers must be alert to pedestrians, especially those carrying white canes.

Transportation

Transportation within a community is a key element to enabling access to all public spaces, employment opportunities, social activities, and more. People who are blind or visually impaired use many different types of transportation to travel to as many places as their sighted friends. Below we summarize some of the issues respondents encounter in using transportation.

- **Ease of use:** Technologies, systems, and solutions are of little help if they are cumbersome or difficult to use. Many participants described bus routes that didn't go to the most relevant parts of town (e.g., shopping, residences, etc.). Others described the complicated planning required to go anywhere in their community due to limited transportation systems and options. Useful systems should reduce stress and improve predictability so that users feel confident about the paths to take, the amount of time required, and any pre-planning that needs to be done to help them reach their destination or achieve their objectives. Ideal systems have built-in flexibility to identify solutions based upon individual needs. They are reliable, meaning that the driver will arrive to and depart from the pickup location on time and ensure that riders arrive at their destinations when expected.
- **Scheduling/requesting a ride:** For many people with vision loss, the first step in getting to a desired destination is scheduling or requesting a ride through a transportation service provider. The ease or complexity of this process significantly impacts the usability of the service. While online scheduling may be ideal for some riders, others report appreciating the ability to schedule or request services over the phone. Respondents suggested options for scheduling some trips the day it is needed, or no more than 24 hours in advance.
- **Waiting for a ride:** Whether waiting for a city bus or for a prescheduled door-to-door paratransit ride, the length and conditions of the waiting experience can impact a service's usability. Riders appreciate service providers' clear communication about any anticipated delays to avoid unnecessary waiting for a ride that is running late. Respondents recommended benches and shelters when waiting outside.
- **Boarding/hailing/entering a vehicle:** Bus stops are often difficult to locate and rarely have tactile signage so that the rider can confirm he or she is at the right spot for the correct bus route. Some paratransit systems that do not offer door-to-door service requiring riders to meet

“ Useful systems should reduce stress and improve predictability so that users feel confident about the paths to take. ”

their vans or buses at specific street corners or curbs, which can be problematic for riders who cannot see the vehicle or find the precise pick-up location. Respondents recommended that drivers call, honk, or otherwise alert a visually impaired person that they have arrived.

- **Courteous drivers:** Drivers who wait for passengers to sit down before moving improve the riding experience. Bus riders need to be certain they exit the vehicle at the correct stop and appreciate automated alerts or alerts from the driver.
- **Information systems that support transit:** Accessible transportation systems must include accessible information systems. Features requested by survey and interview participants include clear, sufficiently loud, accurate, automated announcements on public vehicles and in stations and terminals; beacons at bus stops and in large terminals; signage in braille and audible formats in taxis, on buses, at bus stops, and in stations and terminals; systems to enable information to be accessed over the phone, through accessible apps, and through websites; accessible dissemination of accurate, and timely information about changes to routes or stops; and up-to-date information synchronized with wayfinding apps and other tools such as online maps.
- **System policies:** The rules and policies that structure a community's transportation system(s) may hinder or help with accessibility for people with vision loss. Training of staff and accommodations for wheelchairs and people with multiple disabilities can have positive impacts. However, many policies result in limitations to access for riders with vision loss, including limitations to companion co-riders on paratransit, age restrictions limiting services to riders of certain ages only, restrictions against traveling with children, prioritization of rides for medical needs, and charges for prescheduled rides even when system delays resulted in the passenger being dropped off too late for his or her appointment. Reconsideration of such policies may help to shape systems that are easier to use and provide greater access across communities.
- **Other features of the system:** Participants mentioned other issues with transit and paratransit services, including hub and spoke systems that make it difficult and time consuming to travel from one area of town to another, infrequent buses and trains, unreliability of pick-up times, geographic limitations, and advanced scheduling requirements.

“ Accessible transportation systems must include accessible information systems. ”

Access to Information

People with visual impairments have a range of preferred methods for accessing information, but they almost all share the experience of not having sufficient access to desired and/or necessary information in their communities, whether on street signs, in shopping malls, or in government office buildings. Lack of information impacts access to almost all community spaces, and respondents frequently mentioned the basic problem of identifying who and/or what is in their vicinity or elsewhere in their community. Community services are useless if potential participants do not know the services exist. Likewise, the experience of a public event can be significantly downgraded if the visual information is not relayed in alternate formats. Perhaps most importantly, access to critical public information such as street maps and

emergency broadcast systems can mean the difference between greater independence and dependence on others for people with vision loss.

Survey respondents most often mentioned braille, and they highlighted the need for consistent, high-quality braille labels, signage, menus, and labels on bathrooms, kiosks, maps, and other information readily available to the public. Respondents described elevators, schools, and other public spaces without the required braille labeling. Others requested signage in large, high-contrast print, as not all people

with visual impairments know braille. Printed signage should be accompanied by braille, should be high-contrast, and should be placed in consistent locations for reliable access. Auditory information is particularly important for information that is presented out of arm's reach or in an unexpected location (e.g., the announcement of floors when elevator doors open). A couple of respondents mentioned the need for interpreters at public events, upon request, to accommodate the needs of deafblind individuals.

“ Respondents described elevators, schools, and other public spaces without the required braille labeling. ”

Twenty-first century technologies have the potential to greatly increase accessibility in almost every aspect of life for someone who is blind or visually impaired. The extent to which community systems and spaces adopt and provide accessible technology can be game changing for residents with vision loss. Specifically, survey respondents described the importance of reliable, high-quality internet access in their communities, with several advocating for community-wide publicly available Wi-Fi. Additionally, mobile phones (specifically smartphones) enable greater access for people with visual impairments to everything from live-streamed audio for football games to apps for controlling touch-screen washing machines. Communities that adopt and integrate support for smartphones through apps and other interfaces can increase opportunities for people with vision loss to participate in otherwise inaccessible situations. Finally, many respondents expressed a desire for their communities to keep up with new and current technologies, such as the latest models of accessible pedestrian signals and audio-description devices. They recommended that more information be available online about a business or public space and providing Quick Response (QR) codes that can be scanned on smartphones for quicker access to audio information. Audio description can greatly enhance the experience in a museum or theater if all equipment is in good working order.

General Accessibility of Public Spaces and Facilities

Several respondents advocated for public buildings and spaces to be up to code and ADA-accessible, noting the importance of compliance with laws and standards for accessibility for people who use wheelchairs as well as those who are blind. Some respondents suggested that steps be marked with high-contrast edges and that unexpected steps be avoided to prevent tripping or falling. They suggested that pick-up spaces for paratransit and other vehicles in public places be clearly designated and marked. Participants also described frustration when trying to access Automatic Teller Machines (ATMs), which are available in many public spaces. They should be equipped with speech output so blind and low vision users can use the machines with earphones.

Respondents described barriers in particular places and venues in a community. The diversity of locations they mentioned reflects the wide range of public spaces where people with visual impairments desire equal access in their communities. In Appendix 2, we describe experiences and barriers in various locations, including stores and shopping centers, medical facilities, museums, libraries, schools and

universities, hotels and conference centers, parks and green spaces, fitness centers, restaurants, airports, stadiums and theaters, and government buildings.

Independent Navigation in Public Spaces

The availability and accessibility of directions for navigating a space helps with orientation. Participants reported benefitting from clear verbal directions, braille directories, online directions, text descriptions of floor plans, and push-button access to auditory directories or floor-plan information. Reported physical

barriers to navigation include low-hanging signage, narrow aisles, furniture, and queues of people.

Participants described a range of supportive features in public spaces, including auditory cues like wind chimes and fountains, changing floor textures that indicate intersections or destinations, appropriately placed handrails near ramps and stairs, electronic lifts, and access to human guides. Many respondents suggested that indoor GPS (global positioning system) and beacon systems, connected to smartphone apps, should be available in larger spaces to improve independent navigation.

“ Many respondents suggested that indoor GPS and beacon systems, connected to smartphone apps, should be available in larger spaces to improve independent navigation. ”

Availability of Assistance

While some respondents reported high levels of independence, especially in familiar places, others reported always requiring assistance, particularly in shopping or navigating unfamiliar places. People with vision loss report preferring to decide for themselves whether to use assistance in the community: “I have had individuals ask how they could help me and allow me to describe what assistance I need,” commented one respondent. Participants commented about assistance received from people employed in public places. This assistance could include guidance for visitors and tourists, offering flexible or accessible seating arrangements, providing directions or an overview of a floor plan, serving as a personal shopper, and/or serving as a human guide. The extent to which employees can improve access depends upon each employee’s skills, knowledge, and attitude. Ideally, staff whose offer of assistance is sincere, not overly protective, patient and unrushed, and who is genuinely willing to help and considerate of individual preferences is preferred. Training for employees can improve their abilities to offer meaningful assistance, including knowing the difference between disability and illness, knowing ways to be helpful to people with a range of disabilities, and knowing how to locate and use any accessibility features present in a space (e.g., braille menus or audio-description devices). One survey respondent suggested that assistance could be improved if businesses hired more employees who were blind or visually impaired.

Housing

People with vision loss need accessible, affordable, livable housing to fully enjoy living in a community. People with vision loss may have strong preferences or even requirements for their housing needs depending on transportation and employment options in their community. A community’s accessibility is partially determined by the extent to which accessible rental housing and home-ownership opportunities are available for rent or purchase in the locations that are accessible and livable for community members

with vision loss. One respondent clearly outlined the connection between housing and community accessibility, explaining, “I checked transportation to local stores where I would need to shop and moved to a place where I can walk to what I want or use good public transportation to get there. Transportation figured into my decision of where to precisely live.”

D. Programs and Solutions Proposed and/or Implemented to Support Accessible Communities

This segment of the report summarizes the proposed solutions and strategies mentioned by the many interview and survey participants. As much as possible, the exact words of participants are shared to ensure proper recording of the wide range of creative ideas.

Promote Change

Many of the ideas and priorities shared by participants involved organizing community advocates, leaders, and coalitions to encourage change. These included:

- **Creating opportunities for decision makers to experience public transportation in their communities:** “People need to ride it before they make decisions—for a month, on evenings and weekends, to see the difficulty.”
- **Forming coalitions among neighboring cities and counties:** “I would ask the city council to consider forming some kind of coalition with neighboring counties because our metro area includes several counties and thus is not served adequately by transit services.”
- **Collaborating with nonprofit agencies:** “Several years ago I was at a children’s museum... which had many tactile exhibits. They were working with a nonprofit in that city to increase accessibility.”
- **Uniting in advocacy efforts:** “[There is] no local, organized coalition for structured education and awareness.”
 - **Advocate at times of change/new construction:** “One intersection...is getting widened to seven lanes, unsure of new configuration. [It is] better to advocate for change during design.”
 - **Groups need to communicate to effect change:** “Communication—[the] right groups [are] not talking to each other or not talking effectively to create any change.”



“ [It is] better to advocate for change during design. ”

- **Encouraging everyone to use public transit:** “All citizens would be encouraged to use the bus system to cut down on car traffic...If more people were using the public transportation on the weekends, then having public transportation would be worth paying for on Saturday and Sunday...if the bulk of...citizens were using public transportation, a small train system might be feasible, particularly for those who live a ways out of the city.”
- **Encouraging more local small businesses to advertise:** “...so that more small businesses came to town so that we wouldn’t have to go out of town to do most of our shopping.”
- **Making public data available for use by businesses and entrepreneurs:** “Make public data more accessible to entrepreneurs so that accessible services could be developed.”

Make Information Accessible

Participants mentioned the following strategies with respect to increasing access to information:

- **Make government documents accessible:** “I’d make all city government websites WCAG 2.0 compliant. I’d make government documents readily available in accessible formats in a timely manner.”
- **Make all websites for public services accessible:** “I would... ensure that all public buildings were up to code, including any websites they host.”
- **Have tactile city maps available upon request:** “Tactile maps for public buildings, shopping malls, etc., [and] tactile maps of city streets that can be requested.”

Change Attitudes

Participants shared a variety of ideas related to changing public attitudes or ways of thinking about blindness and disability:

- **Be open to new ideas:** “Learning from other countries—Japan is highly advanced, accessible for multiple senses. Take the best ideas from everyone, have the humility to admit that you don’t always have the best ideas.”
- **Go beyond ADA requirements:** “The general public’s attitude toward accessibility is to meet the minimum legal requirements and go no further. Small businesses are not required to comply with ADA regulations because compliance can be really expensive.”
- **Highlight the connection between voting and services:** “overall understanding of connection between voting and getting the services you need.”
- **Implement universal design principles:** “...I would say universal design should be the rule. One can do a lot with, for example, floor textures. However, sound cues are only as good as the hearing of the one meant to use them as an aid...Stairs ought to be outlawed, but ramps are good friends...A multisensual experience is required to make a world.”

“ Have the humility to admit that you don’t always have the best ideas. ”

Offer New and Improved Services

The following are ideas for new or improved services to increase accessibility and livability in communities:

- **Provide individualized assistance to people with vision loss:** “Assistance with shopping and other daily work.”
- **Provide adaptive/accessible programs:** “We need more...opportunities and events for disabled individuals”
- **Assign staff to help people navigate around obstacles:** “Enforce where sidewalks are kept clear; if not, then have someone navigate people to a safe location.”
- **Increase delivery options:** “We need more delivery services.” “Most of my shopping is done online for easier selection and home delivery.”
- **Encourage mentorship:** “More mentorship of young people.”
- **Use paratransit to connect to public transit:** “I would provide paratransit to bus stops, the train station, and the airports.”
- **Offer “touch tours”:** “In Philadelphia we have Philly touch tours.”
- **Provide technology to people with vision loss:** “Programs for the blind [need] to receive technology.”
- **Provide recreation and enrichment opportunities:**
 - **Foreign language courses:** “I would have the library or senior center do a low-cost foreign-language course for those who want to learn, like, Spanish, Italian, French or German. Or Chinese.”
 - **Art and music programs:** “I’d also have my local community college do low-cost art and music programs in addition to all the education programs they do.”
 - **Accessible sports and fitness:** “Increase accessible sports, improve access to parks”
 - **Tandem biking:** “More accessible activities—for example, tandem biking”
 - **Indoor public pools:** “I would have more places to go do something besides the mall and the movies. I would build an indoor public pool.”
- **Provide shuttle systems for large parking lots:** “I would also create an accessible shuttle system for larger facilities for those who have trouble navigating parking lots.”
- **Offer support groups:** “Support groups or systems for the blind.”
- **Provide training for people with vision loss:** “Need consistent skill training.”
 - **Additional service options for mobility training:** “The system for getting mobility training is reserved mostly for either the department of rehab clients or seniors under Title Seven. This is great, but not for everyone.”
 - **Mobility training:** “I would make it possible for our local center for the blind to offer everyone mobility...” “O&M instruction can be improved in public schools.”
 - **Independent living skills training:** “I would make it possible for our local center for the blind to offer everyone... daily living skills training.”

- **Technology training:** “I would make it possible for our local center for the blind to offer everyone... computer class”

Explore New and Improved Technologies

In addition to services, the following new or improved technologies were suggested by participants:

- **Driverless carts for indoor transport:** “Airports would have small, driverless carts which would take you from one place to another within the airport.”
- **GPS with braille display:** “I would... have GPS that knew where you were inside, and outside and could read signs for restaurants and other places and give turn-by-turn directions. This GPS would work through a braille display, not just audio, so that you could concentrate on sounds around you like traffic.”
- **Clickers to request crossing at intersections:** “Traffic signals would talk, and I wouldn’t have to find the button to demand crossing, I’d carry a clicker.”
- **Beacons providing information to pedestrians:** “Maybe some more location pinpoints that would pop up on phone apps describing buildings being passed while walking past them, etc. kind of like the ones that are already available in some apps which remind you to buy certain groceries when you enter a particular store and such.” “Bluetooth beacons could be used to provide additional information at locations (name of venue, navigation hints, etc.)”
- **Enhanced, accessible online services/apps/opportunities:** “I would invest in both more transportation options and enhanced ability to get things done online. That would create more jobs and give people money to decide for themselves what next priorities should be.”
- **On-demand description/assistance via phone or apps:** “Have a live person through the camera on a smartphone when you need it so if you are lost, you can simply initiate for help.” “The AIRA Visual Interpreter service is a huge help in addressing in-person shopping barriers.”
- **Self-driving vehicles:** “For paratransit, information such as more exact arrival time and whether the trip will be direct or with picking up other people would help for timing. The advent of self-driving vehicles will soon assist with much of this.”
- **Updated GPS/POIS (global positioning system/point of interest) systems and map data:** “One thing that [I] would improve is the GPS POIS in my city. The map has POIS that do not exist. I would also map trains and POIS along our greenway.”
- **Creative wayfinding options:** “Wayfinding that is not cumbersome and does not require a phone app/headphones.”

“ Bluetooth beacons could be used to provide additional information at locations. ”

Change Policies and Increase Funding

Respondents suggested several ways to change policies or increase funding to improve accessibility and livability in communities:

- **Offer incentives for businesses to be more accessible:** “I would offer training programs to teach people how to be more accommodating to blind customers and provide incentives for businesses to participate.”
- **Maintain a database to provide incentives/discounts for people with disabilities:** “I would create... [a] database and incentives for blind and sighted participants in parks and recreation areas, gyms.”
- **Offer required driver training for relicensing:** “Relicensed, retesting, retraining of drivers.”
- **Provide public-service employees training from people with disabilities:** “Any employee that has contact with the public would be required to attend sensitivity training, conducted by people with disabilities who can explain to people how best to help us.”
- **Enforce traffic/transportation laws:** “Enforce traffic laws to discourage vehicles from entering crosswalks during a red light.”
 - **Speed cameras:** “Cameras/sensors on lights/signs to stop traffic from speeding...”
 - **Police should shadow people with disabilities:** Police should shadow BVI (blind and visually impaired) people and learn how they navigate.”
 - **Increase fines for violators:** “Make disrespectful drivers receive a hefty fine if they violate any of the pedestrian accessibility laws.”
 - **Target unsafe drivers, such as those who text while driving:** “I would definitely enforce laws to penalize people who text and drive; their irresponsibility can be deadly.”
 - **Provide training for law enforcement officials:** “I would like to see the police undergo training on how to deal with denial of guide dog access especially at our public, elevated train station.”
- **Mandate fully accessible, supportive education systems:** “Any student with any disability in the school system would get the least restrictive environment. This would mean whatever they needed to make their education easiest and seamless it would happen.”
- **Make accessible arts grants available:** “Provide grants to public arts institutions to make arts more accessible.”
- **Expand infrastructure:** “More infrastructure spending.”
- **Increased accessibility legislation:** “Revise legislation to add the necessity for [accessibility including braille, beacons, and floor-level indicators]. Just as wheelchair entrances to buildings are a requirement, these things should also be requirements. Using technology and or tactile signage, it is possible to create a city where people with visual impairments will be able to travel around with more ease.”
- **Incorporate rideshare/taxis into paratransit services:** “Paratransit would be allowed to use ridesharing companies to reduce costs for disabled riders.”
- **Improve sidewalk maintenance and upkeep policies:** “Property owners should not have to maintain sidewalks.”

- **Require regular testing, repair of timing at intersections:** “I would have a person or group who fixed the timing of crosswalk lights, turned on APS, tested it regularly and fixed it.”
- **Offer subsidies to drivers of people with vision loss:** “Subsidies for drivers for the visually impaired, to take them to weekly appointments or other appointments as necessary.”
- **Contest historical preservation policies/laws:** “I would fight the preservation associations again to allow buildings in historical neighborhoods to be renovated to install elevators for people with physical disabilities.”

Implement Systems Changes

The final proposed improvements target high-level impacts on community-wide systems:

- **Mandate consistent implementation of accessibility features:** Greatest barrier to accessibility is lack of “uniformity of design—accessibility features are inconsistently implemented”
- **Increase employment opportunities:** “I would create more jobs and give people money to decide for themselves what [their] next priorities should be.”
 - **More job developers and placement people:** “Agencies need to improve job placement. Need more job developers and job placement people.”
 - **Employers utilize rideshare to pick up employees:** “Less cars, more businesses should use/offer Uber/Lyft-like services to pick up employees.”
 - **Telecommuting options/working from home:** “work with employers to use accessible hardware and software solutions to increase accessible work at home options for seniors and individuals with disabilities so they can earn more money.”

“ The greatest barrier to accessibility is lack of uniformity of design. ”



SECTION III

APPENDIX 1: STATISTICAL TABLES

Table 1. Highest Priority for Accessibility Improvements for In-Person Interview Respondents at ACB, NFB, and AER-O&M Conventions

Category	Number of Responses	Percentage of Total Responses	Adjusted Percentage
Transportation/Travel	253	63.57%	64.05%
Shopping	58	14.57%	14.68%
Workplace/Daily Living	29	7.29%	7.34%
Public Buildings	28	7.04%	7.09%
Parks/Recreation	14	3.52%	3.54%
Entertainment	13	3.27%	3.29%
No Response	3	0.75%	--
Total	398	100.00%	100.00%

Table 2. Second Highest Priority (if given) for Accessibility Improvements for In-Person Interview Respondents at ACB, NFB, and AER-O&M Conventions

Category	Number of Responses	Percentage of Total Responses	Adjusted Percentage
Shopping	10	52.63%	52.63%
Parks/Recreation	2	10.53%	10.53%
Public Buildings	2	10.53%	10.53%
Transportation/Travel	2	10.53%	10.53%
Workplace/Daily Living	2	10.53%	10.53%
Entertainment	1	5.26%	5.26%
No Response	0	0.00%	--
Total	19	100.00%	100.00%

Louisville Respondents: Respondents Living within Louisville MSA and Outside Louisville MSA: Tables 3, 4 and 5.

Table 3: Types of Transportation Used by Louisville Respondents

Type of Transportation	Respondents within Louisville MSA	Percentage of Louisville Respondents	Respondents Outside Louisville MSA	Percentage of Non-Louisville Respondents	All Respondents	Percentage of All Respondents
Driven by someone you know	35	92.11%	12	92.31%	47	92.16%
Paratransit	30	78.95%	8	61.54%	38	74.51%
Sidewalks	28	73.68%	7	53.85%	35	68.63%
Rideshare (Uber, Lyft, etc.)	27	71.05%	5	38.46%	32	62.75%
Public Transportation	25	65.79%	5	38.46%	30	58.82%
Taxi	19	50.00%	9	69.23%	28	54.90%
Bike	2	5.26%	0	0.00%	2	3.92%

Table 4: Highest Priority for Accessibility in Louisville and Surrounding Communities

Category	Respondents within Louisville MSA	Percentage of Louisville Respondents	Respondents Outside Louisville MSA	Percentage of Non-Louisville Respondents	All Respondents	Percentage of All Respondents
Shopping	16	42.11%	6	46.15%	22	43.14%
Workplace/ Daily Living	8	21.05%	1	7.69%	9	17.65%
Parks/ Recreation	5	13.16%	2	15.38%	7	13.73%
Entertainment	4	10.53%	1	7.69%	5	9.80%
Public Buildings	4	10.53%	2	15.38%	6	11.76%
No Response	1	2.63%	1	7.59%	2	3.92
Total	38	100.00%	13	100.00%	51	100.00%

Table 5: Satisfaction with Internet Availability and Affordability in Louisville and Surrounding Communities

Response	Respondents within Louisville MSA	Percentage of Louisville Respondents	Respondents Outside Louisville MSA	Percentage of Non-Louisville Respondents	All Respondents	Percentage of All Respondents
Yes	16	42.11%	7	53.85%	23	45.10%
No	20	52.63%	4	30.77%	24	47.06%
N/A	2	5.26%	2	15.38%	4	7.84%
Total	38	100.00%	13	100.00%	51	100.00%

**Online Survey Responses: Nationwide and Other Countries:
Figure 1, Table 6 through 17**

Figure 1: Perceptions of Their City’s Accessibility by Online Survey Respondents

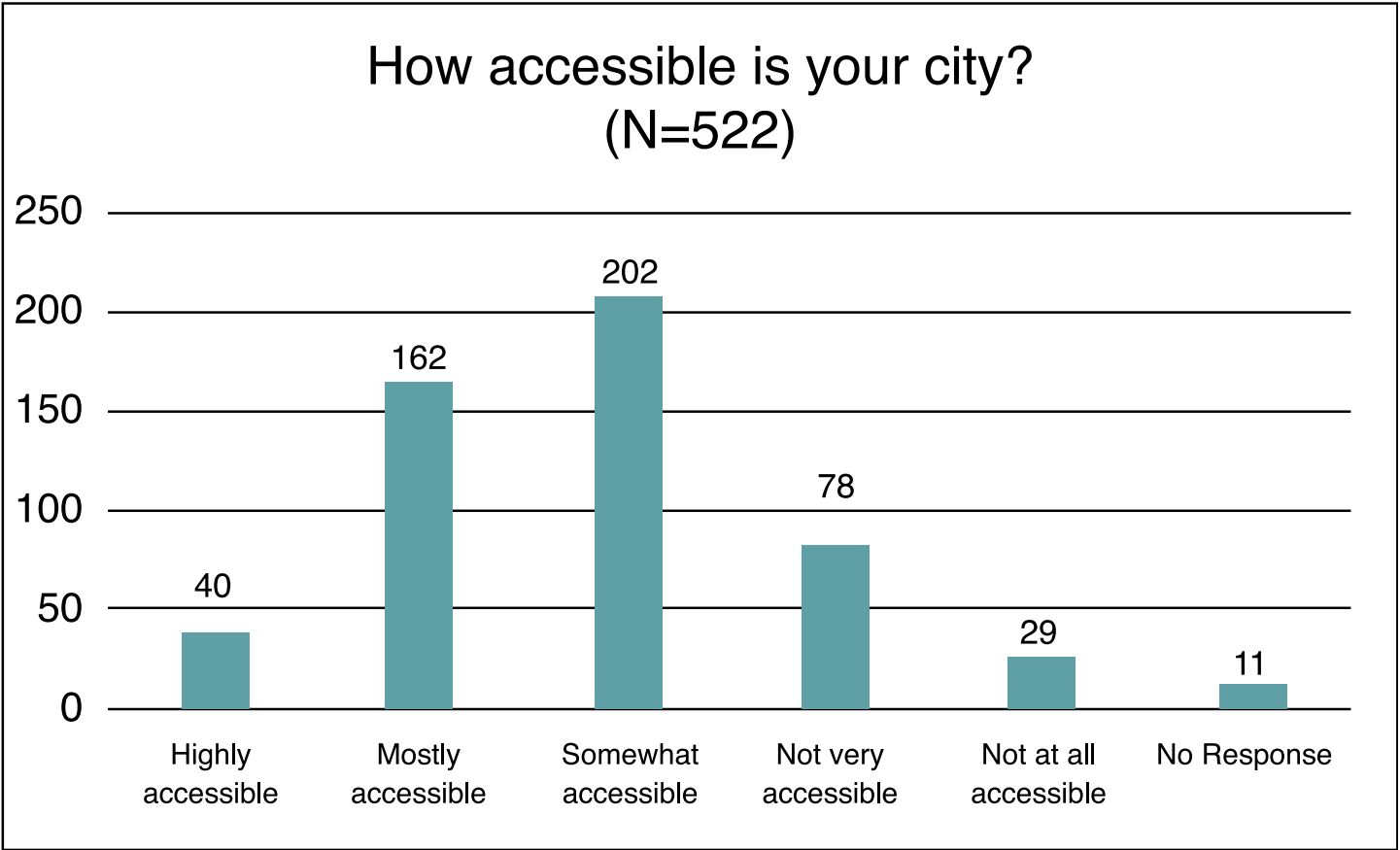


Table 6: Percentage Ranking of Highest Priority for Accessibility Improvements

Category	1st	2nd	3rd	4th	5th	Average Rank
Workplace/Daily Living	46.99%*	16.63%	15.38%	8.52%	12.47%	2.23
Public Buildings	18.30%	27.86%*	26.20%	18.30%	9.36%	2.73
Shopping	20.17%	25.57%*	24.12%	16.01%	14.14%	2.78
Entertainment	12.47%	11.85%	24.12%	23.08%	28.48%*	3.42
Parks/Recreation	7.48%	14.76%	23.49%	28.27%*	25.99%	3.51
* = highest priority in that rank						
Number of Responses = 481						

Table 7: Importance of Green Space for Guide Dogs

Level of Importance	Number of Responses	Adjusted Percent of Responses
Highly important	23	23.47%
Fairly important	19	19.39%
Neutral	40	40.82%
Not very important	8	8.16%
Not at all important	8	8.16%
No response	424	--
Total	522	100.00%

Table 8: Types of Transportation Used Most Often

Type of Transportation	Number of Responses	Percentage of Respondents
Pedestrian walkways	343	65.71%
Lyft/Uber/Ridesharing	295	56.51%
Buses	289	55.36%
Taxis	131	25.10%
Trains	103	19.73%
Subway/Metro systems	82	15.71%
Other (see note below)	233	44.64%
Total	522	

Note: The following is a list of the responses entered for Other: Feet, Personal vehicle/car, C-van/Sun Van, Paratransit/Dial-a-Ride, Friends/family, Volunteer service cars, Project Mainstream, Road to Work, Bicycle, Tandem bicycle, Ride share/carpool, Metro mobility, MetroAccess, Hire private individuals, Tram service, Surface trolley, On Demand transportation service, Bus Plus (like paratransit-no income guidelines), Light rail, Electric vehicles, Flight, Ride DuPage (24-7 service), Park and Ride, (the bleeping) Street car, Ferries.

Table 9: Are Public Transportation Centers in Your Community Accessible?

Response	Number of Responses	Adjusted Percent of Responses
Yes	42	52.50%
No	21	26.25%
Not applicable	7	8.75%
Don't know	10	12.50%
No response	442	--
Total	522	100.00%

Table 10: Which Type of Public Building is Most Important to Navigate Independently?

Building Type	Number of Responses	Adjusted Percentage of Responses
No response	441	--
Government building	29	35.80%
Other (see note below)	18	22.22%
Library	13	16.05%
Post office	11	13.58%
Community center	10	12.35%
Total	522	100.00%

Note: The following is a list of the responses entered for Other: Universities, Hospitals/medical offices, Grocery stores, Voting precincts, Place of employment, Restaurants, Shopping centers, Airport, Apartment.

Table 11: Which Type of Store is Your Highest Priority for Independent Navigation?

Store Type	Number of Responses	Adjusted Percentage of Responses
Grocery store	56	57.14%
Big box store (Target, Walmart, etc.)	18	18.37%
Shopping mall	13	13.27%
Other (Please explain.) (See note below)	9	9.18%
Local, independent retailer	2	2.04%
No response	424	--

Store Type	Number of Responses	Adjusted Percentage of Responses
Total	522	100.00%

Note: The following is a list of the responses entered for Other: Restaurants, Don't know, All listed places.

Table 12: Ability to Shop at Stores Respondents Need

Question	Yes	No	Don't Know	Not Applicable	Total	Number of Responses
Q15. Does your transit service currently provide access to the shopping areas you need?	76.53%	12.24%	6.12%	5.10%	100.00%	98
Q16. Do navigation or other accessibility challenges prevent you from shopping independently?	62.24%	30.61%	7.14%	0.00%	100.00%	98

Table 13: What Aspects of Local or City Park Accessibility Could Be Improved?

Aspect of Park Accessibility	Number of Responses
Tactile maps	88
Braille signage	85
Convenient transit service	77
Quality of trails or paths	62
Other (see note below)	16
Total	522

Note: The following is a list of the responses entered for Other: Braille/Large print informational pamphlets, Online maps, Online navigation directions, More affordable/flexible transportation, Beacons, More facilities/activities for challenged individuals, Assistants, Wheelchair friendly community gardens, Accessible GPS guidance , Staff sensitivity training, Better playground access, Improved GPS POIs.

Table 14: Highest Priority for Accessibility of Museums

Aspect of Museum Accessibility	Number of Responses	Adjusted Percentage of Responses
Audio description	41	37.27%
Staff training on accessibility	25	22.73%
Braille signage and labels	20	18.18%
Other (please explain) (see note below)	18	16.36%
Tactile maps or navigation tools	6	5.45%

Aspect of Museum Accessibility	Number of Responses	Adjusted Percentage of Responses
No response	412	--
Total	522	100.00%

Note: The following is a list of the responses entered for Other: Unsure, BVI family member, Allowing BVI people to touch, GPS-based app, All of the above, Tactile/3D models of objects, Large print directional signs, Large print brochures.

Table 15: Accessibility of Fitness Centers

Question	Yes	No	Don't Know	Not Applicable	Total	Number of Responses
Q14. Is your preferred fitness center, gym, studio, etc., accessible?	17.65%	25.49%	29.41%	27.45%	100.00%	102

Table 16: Is There a Medical Facility You Have Visited that You Could Not Navigate Independently?

Response	Number of Responses	Adjusted Percentage of Responses
Yes	38	41.30%
No	35	38.04%
Don't know	13	14.13%
Not applicable	6	6.52%
No response	430	--
Total	522	100.00%

Table 17: Where Respondents Can Access the Internet

Location	Number of Responses	Adjusted Percent of Responses
Home	39	46.99%
Other (please explain) (see note below)	24	28.92%
Library	10	12.05%
School	5	6.02%
Workplace	5	6.02%
No response	439	--



SECTION IV



APPENDIX 2: RESPONSES

Location	Number of Responses	Adjusted Percent of Responses
Total	522	100.00%

Note: The following is a list of the responses entered for Other: McDonalds/fast food restaurants, Starbucks/coffee shops, All listed places, Many public places, Xfinity hotspots, Church, Big-box stores (Target, Walmart, etc.), Parks/rec buildings, Gyms, Malls, City government (center of town).

Qualitative methods, supported by the Dedoose qualitative analysis software, were used to identify themes present in the combined dataset. Combining the three data sources (online survey, in-person surveys from consumer conventions, and in-person interviews in Louisville) strengthened the credibility of the findings as all three data sources supported the identification of similar themes.

As a whole, the datasets support a mapping of the factors to be considered in assessing the extent to which a community or geographic area is accessible and fully enjoyable by people with vision loss (primarily from the perspective of adults who would self-identify as visually impaired or blind). These factors can be divided into a few major themes, each with subthemes, in the following structure:

- Qualities of the community as experienced by adults with vision loss, with major subthemes of:
 - Community characteristics
 - Community values and attitudes
 - Public infrastructure, programs and services
 - Public spaces, businesses, and events in the community
 - Transportation in the community
 - Pedestrian experiences in the community
 - Housing
- Values and preferences of community members with vision loss
- Diverse characteristics of individuals with vision loss
- Programs and solutions proposed and/or implemented to support accessible communities.

The following sections of this report describe findings for each of these themes and subthemes.

A. Qualities of the Community as Experienced by Adults with Vision Loss

Communities in the United States vary widely on a range of factors—from politics and geography, to climate and history. Many of these variations are beyond a community's control, and many aspects of a community change and evolve over time, sometimes as a result of direct intervention, and sometimes more subtly with no identifiable catalyst. Importantly, communities must consider not just whether or not accessibility is offered at one or more places within the community, but more importantly, the extent to which the entire community has adopted and integrated efforts to be more accessible and livable. Accessible transportation that ends at a county line or assistance that stops at the front door of a building may be effectively useless to people who need to reach a hospital or attend a meeting beyond the imposed access barrier.



Community Characteristics

“Community characteristics” identified by respondents in this dataset involve aspects of a community that are historic, geographic, or otherwise mostly beyond the control of the community’s current citizens. When people with vision loss have a choice about where to live, these factors may encourage or discourage them from settling down in certain communities; many people with vision loss do not have the resources or do not wish to relocate, in which case these characteristics must be taken into account as part of the factors influencing accessibility and livability.

The following community characteristics were described as important and relevant to accessibility and livability:

- **Age of the city and/or its buildings:** An online survey respondent wrote, “Cambridge, and by extension, Boston, is a city that is old. As a result, the sidewalks and the streets are uneven, irregularly set up.” Another person wrote, “We have good transportation available, but buildings tend to be old and inaccessible.” While improvements can be made to fix outdated systems and infrastructure, often, some of the most basic features such as the width of streets and the design of important buildings are directly related to the era in which the city or neighborhood developed.
- **Relative locations of key destinations within the city:** Some cities are designed with intermixed “live-work-play” neighborhoods, where residents can easily find entertainment, shopping, employment, and housing within a few-block radius. Other communities, due to zoning or historic factors, have distinct residential and business districts. An online respondent wrote that it was “nice having a lot within downtown, which is easy to walk through.” However, living downtown can present challenges when shopping and other destinations are mostly in the suburbs, as one participant wrote, the “downtown area is accessible but outlying areas with malls, etc., are not.”
- **Relative distance to other towns/cities:** Some areas of the United States are densely populated, with one suburb merging into another or a collection of suburban areas just outside of a larger city center. In other places, there are vast rural or unoccupied tracts of land between towns and larger cities. Many participants reflected upon the impact living further from a city center has upon accessibility, including, “In the outer areas of the city, transportation is not as good. Blind people who live in the outer areas need to take paratransit, as that is most reliable.”
- **Navigability and walkability:** The design of a city’s streets is often connected to its history—whether it grew up around a river or railroad crossing, or perhaps a city was intentionally established as a planned community or with a pre-ordained street plan. The extent to which the layout of a city street promotes easy navigation certainly impacts the level of accessibility and livability experienced by many people with vision loss. Survey respondents remarked positively about the grid-system of streets in Chicago and Louisville, but one wrote that Philadelphia “isn’t [an] easily navigable city because of its layout.” Several participants remarked on the extent to which their community was “walkable,” factoring in characteristics ranging from the distance between destinations to the presence of sidewalks, highways, and steep hills.
- **Size of the city:** The size of a city impacts its navigability and many other factors related to

“ In the outer areas of the city, transportation is not as good. ”

accessibility. Large cities may have a range of interconnected systems and services, while small cities may not be able to support many public services. A participant from Los Angeles shared, “It’s as though there are many cities trying to combine as one, which makes it harder; some are more accessible than others.” Population density also plays a role, as a large county with a widely distributed population may have a hard time supporting services for all residents. A participant shared that in the large city/county of Jacksonville, Florida, there are many places with no access to the public transportation system.

- **Number of residents with visual impairments:** Certainly, accessible communities would be a draw to people with vision loss, and people with vision loss also report that the presence of other people with blindness/visual impairment also leads to more accessible communities. Survey respondents reported that in small towns, not having other people with vision loss living in the community limits the community’s attention to accessibility issues.
- **Presence of a school for the blind or state disability services program:** Schools for the blind and state disability offices help to increase awareness and promote accessibility in their surrounding neighborhoods. These schools and offices are potential employers of people with blindness or visual impairment, and school and program alumni may choose to find employment and residences near their campuses. One participant remarked, “Our city has the Wisconsin School for the Blind, so they are likely more accessible than most.”

Community Values and Attitudes

In addition to the physical characteristics of a community described above, the attitudes and values of the residents of a community also impact the extent to which the community is experienced as accessible and livable by people with vision loss. The following seven factors were described by participants as relevant aspects of a community’s values:

- **Equality of opportunity and participation:** A sighted respondent to the online survey (either a family member or a service provider for a person with vision loss) wrote that in a “fully accessible” city, a person with visual impairment would have equal opportunity to everything everyone else does. Another participant noted the importance of communities providing people with vision loss “equal footing in terms of experience.”
- **Awareness of sighted people to the presence of people with vision loss:** Communities will never address accessibility and livability if the sighted majority ignores or overlooks their fellow citizens who are blind/visually impaired. Specifically, participants mentioned the need for greater awareness that people with vision loss have abilities and potential as well as awareness of existing laws and policies related to accessibility for people with visual impairments.
- **Openness to accessibility improvements:** Communities vary in their willingness and adaptability to change. For a community to become more accessible for people with vision loss, the citizens and leaders must be open to considering new ways of thinking and problem-solving. The concept of universal design was mentioned by several participants, reflecting the need for city planning and infrastructure design that incorporates features that work for everyone. An interviewee explained, “People have a limited view of accessibility depending on their own experience,” and that for a city to be fully accessible, “all sorts of accessibility must

“Equal footing in terms of experience.”

be considered.” Additionally, a commitment to accessibility must be more than just lip service. A respondent described a situation in which “audible signals at intersections are not installed, two years past promised dates.”

- **Friendliness and helpfulness:** Many stereotypes exist about the friendliness of certain cities and regions within the United States. The actual experience of friendliness and helpfulness within a community has important impacts on perceptions of accessibility and livability. In one city, a respondent described “people generally tend to be on the friendly side, and are willing to help,” while in a different town, a respondent wrote about “an attitude of unhelpfulness” experienced in many public buildings.
- **Interdependence:** One interviewee suggested the consideration of a pragmatic question when asked about a community’s accessibility—“What is the heart or conscience of a community—[a hand] up or hand out?” The attitude of a community’s citizens towards assisting others may greatly affect how a person with vision loss participates. Do people with disabilities feel a part of a collaborative effort, or are they viewed as passive recipients of charity or public assistance? A community attitude of interdependence promotes participation and equality for people with visual impairments.

Public Infrastructure, Places, Programs, and Services

Many of the most-mentioned aspects of a community’s accessibility involve the infrastructure, programs, and services available in the community. A community’s infrastructure, programs, and services are more easily modified and adapted to improve (or in some cases, hinder) accessibility and livability.

The description of this sub-theme begins with broad characteristics that are important to the accessibility and usefulness of community features like roads and buildings, followed by a consideration of specific spaces and services with unique relevance to people with vision loss.

The following factors influence the level of accessibility and livability afforded by a community’s infrastructure, programs, and services:

- **Access to information:** People with visual impairments have a range of preferred methods for accessing information, but they almost all share the experience of not having sufficient access to desired and/or necessary information in their communities, whether on street signs, in shopping malls, or in a government office building. One participant expressed a desire for a transportation system that was “speech friendly”—providing information in auditory formats. Other participants mentioned braille and haptic feedback as important means of access. Lack of information impacts access to most community spaces, and respondents frequently mentioned the basic problem of identifying who and/or what is in their vicinity or elsewhere in their community.

Community services are useless if potential participants do not know the services exist. Likewise, the experience of a public event can be significantly downgraded if the visual information is not relayed in alternate formats. Perhaps most importantly, access to critical public information, such as street maps and emergency broadcast systems, can mean the difference between greater independence and total dependence for people with vision loss.

- **Affordability:** Many people with visual impairments have limited resources and thus depend on limited budgets, discounted/subsidized services, and the most affordable of accessible options in their communities. Even disability-specific services like paratransit can become too

expensive for the people who depend on them. One participant suggested that if her community would implement the same program as she had used in San Francisco, she could “pay \$15 a month and get a [card] with \$90 worth of cab fare...this would add

to the possibility of going out whenever one wanted.” Another participant from a more rural area responded that a typical Uber ride (her only accessible option to go into town) costs an unaffordable \$20 in each direction.

“ Even disability-specific services like paratransit can become too expensive for the people who depend on them. ”

- **Opportunities to pursue interests:** Accessible, livable communities for people with visual impairments must ensure access not only to “the essentials” of groceries, healthcare, employment, and so on, but also to the places and spaces where people want to go to explore, learn, create, release stress, enjoy nature, and so on. Specifically, one interviewee mentioned the need for communities to have accessible places for fitness and exercise, and another lamented the lack of entertainment venues in her town.
- **Options:** Ideally, infrastructure, programs, and services should not force community members into a single or standardized solution; rather, accessibility and livability are optimized when people have choices about how, when, and where to engage with opportunities and systems. Responding to a question about what he or she would change if given unlimited resources, one participant highlighted the importance of options, saying “I would invest in more transportation options and enhanced ability to get things done online. That would create more jobs and give people more money to decide for themselves what [their] next priorities should be.”
- **Reliability:** Programs, services, and infrastructure are of little use if community members cannot depend on them to consistently operate as expected. One survey respondent noted, “the paratransit, when I use them, are never on time so I generally use Uber or Lyft,” (which are more expensive). Another participant described a paratransit system that regularly runs late or “forgets about you!” Reliability is also critical for other community supports like emergency alerts, automated pedestrian signals, and even audio description devices at cinemas and theaters.
- **Ease of use:** Technologies, systems, and solutions are of little help if they are cumbersome or difficult to use. Many participants described bus routes that seemed not to go to the most relevant parts of town (shopping, residences, etc.). Others described the complicated planning required to go anywhere in their community due to limited transportation systems and options. Useful systems should reduce stress and improve predictability so that users feel confident about the paths to take, the amount of time required, and any pre-planning that needs to be done to help them reach their destinations or achieve their objectives. Ideal systems have built-in flexibility to identify solutions based upon individual needs. One respondent expressed

“ Ideal systems have built-in flexibility to identify solutions based upon individual needs. ”

frustration that her paratransit system “is very unwilling to work with [her] to get to potential employers.”

- **Efficiency:** No one likes to wait; however, people with vision loss can be put in particularly difficult situations by inefficiencies that waste time and/or cause delays. Shopping, traveling, navigating, communicating, and many other daily tasks can take longer for people with visual impairments due to less efficient systems or the necessity of depending on others. This leaves even less time in the day to complete tasks and enjoy life in the community. Many participants described the frustration of having to rely on highly inefficient systems, including long wait times and limited availability for supposedly on-demand transit services. Some services are only available during business hours or on weekdays, which prevent people with vision loss from accessing these services at more convenient times. Other services expect users to tolerate indefinite wait times, complicating the scheduling of rides, access to employment, and so on.
- **Integration of technology:** Twenty-first century technologies have the potential to greatly increase accessibility in most every aspect of life for someone who is blind or visually impaired. The extent to which community systems and spaces adopt and provide accessible technology can be game changing for residents with vision loss. Specifically, survey respondents described the importance of reliable, high-quality Internet access in their communities, with several advocating for community-wide publicly-available Wi-Fi. Additionally, mobile phones (specifically smartphones) enable greater access for people with visual impairments to everything from live-streamed audio for football games to apps for controlling touch-screen washing machines. Communities that adopt and integrate support for smartphones through apps and other interfaces can increase opportunities for people with vision loss to participate in otherwise inaccessible situations. Finally, many respondents expressed a desire for their communities to keep up with new and current technologies, such as the latest models of accessible pedestrian signals and audio description devices.
- **System reputation:** The reputation of public systems can encourage or deter participation. Several participants in the APH dataset expressed that they were not using systems that they had learned or heard were difficult or dysfunctional. If a community makes improvements to a system or service, it may need to follow up with a public-relations campaign to ensure that potential users are aware of the improvements. One participant shared that the paratransit system in her community was so detested that instead of its actual name, Access, some riders referred to it as “Abscess.”
- **Sufficiency for the size of the population:** Any system, space, or service offered in a community must take into account the size of the user population. A participant from the populous city of Austin shared, “Our public transportation system is more than adequate, but services are still needed for moving more people effectively and efficiently.”
- **Sufficient funding:** In order to provide effective, efficient services sufficient to the size of the user population, communities must allocate sufficient funding. In order to ensure enough funding, the people making funding decisions must know who is using the systems. One respondent shared that a local public transportation system was not well-funded, quoting the state governor’s uninformed proclamation that “We can all get in a car and drive.”
- **Age-appropriateness:** Importantly, programs and services are not one-size-fits-all. Communities must consider whether their accessible solutions are comprehensive enough to meet the needs of diverse people of all ages. A participant shared that although there is a city bus near her home, it is not a good fit for her son as there is little support for younger riders with disabilities.

Public Spaces, Businesses, and Events in the Community

While the previously discussed factors have applied to transportation, navigation, and all aspects of community life, the following subthemes are specific to public spaces, business, and events. This topic can be subdivided into characteristics and features of spaces, factors impacting independent navigation, characteristics of other people in the space, and, finally, factors specific to particular types of public spaces.

Characteristics and Features of Spaces: Regardless of the space, certain characteristics can promote or inhibit access for people with vision loss. (**Note:** This list does not include factors impacting independent navigation, which is discussed separately.):

- **Text/signage accessibility:** Whereas sighted visitors to a public space typically have easy access to information presented on screens, signs, flyers, and so on, people with visual impairments may need alternative formats in order to have equal access to information. Braille was among the most popular accommodations mentioned by survey and interview participants, and they highlighted the need for consistent, high-quality braille labels, signage, menus, and so on. Although the Americans with Disabilities Act (ADA) required braille in more public spaces, many respondents described elevators, schools, and other public spaces without the required braille labeling. Accessible communities should ensure high-quality braille and replace braille signage that is inaccurate or has been damaged or defaced.

Beyond braille, participants described a range of additional factors influencing their access to text-based information. Many public facilities use interactive screens or video to display information but neglect to ensure alternative modes of access. Kiosks and maps are often also inaccessible, limiting access to important communication and/or participation.

Some participants mentioned a preference for large print and/or audible signage (not all people with vision loss can read or prefer to read braille). Auditory information is particularly important for information that is presented out of arm's reach or in unexpected locations (e.g., the announcement of floors when elevator doors open). Printed signage should be accompanied by braille, should be high-contrast, and should be placed in consistent locations for reliable access by people with vision loss.

Respondents provided several unique suggestions to improve access to text in public spaces, including increasing the amount of information available online about a business or public space and providing QR codes that can be scanned on smartphones for quicker access to audio information. One participant suggested that audio-recordings are especially useful when extended amounts of information need to be read (e.g., on a form or as part of an educational display).

- **Audio description:** The provision of audio description can greatly enhance the experience of a person with vision loss in a public space or event that is primarily visual. Often in museums and theaters, special devices are provided that help users access recorded or live narrations

“ Many public facilities use interactive screens or video to display information but neglect to ensure alternative modes of access. ”

of visual content. To provide access, these devices must be in working condition and there must be enough devices so that everyone who needs one can have access. One interviewee explained, “Theaters should have an adequate supply of audio descriptive devices so that I can go to a movie with a group of blind friends.” Other participants expressed a preference for being able to access audio description using his or her own device (e.g., a smartphone) and a desire for access to options for individualizing the audio description experience.

- **Visual factors:** Many people with visual impairment have some light perception and/or functional vision; thus, there are visual factors that can enhance or inhibit the accessibility of public spaces for people with vision loss. Participants mentioned visual clutter, florescent lighting, and glare as potential problems. Lighting preferences may vary among different people with vision loss, therefore the ability of a venue to adjust lighting could be especially helpful.
- **Maintenance and upkeep:** Buildings that are not well-maintained can pose a variety of hazards and inhibit accessibility, not just for people with disabilities! Accessibility features must be well-maintained and in working order whenever spaces are open to the public.
- **Compliance with standards:** Several respondents advocated for public buildings and spaces to be up to code and ADA-accessible, noting the importance of compliance with laws and standards for accessibility. Ensuring that public places followed accessibility rules would go a long way towards increasing community accessibility and livability for people with disabilities.
- **Elevators, steps, and ramps:** Accessibility should include safe access to all parts of a public space. Where there is more than one level to a building or where the level of a platform or curb changes, designers should ensure appropriate placement of steps and/or ramps or elevators. Steps should be designed with high-contrast markings to indicate the edge of each step, handrails should be provided, and unexpected steps should be avoided to reduce the risk of tripping or falling. For elevators, one participant proposed a unique solution of integrating voice-activation to enable riders to verbalize the floor number of their desired destination. In another respondent’s opinion, “Stairs ought to be outlawed, but ramps are good friends. One should NOT rely on electric means to rise or descend, for they can/will fail. A multi-sensual experience is required to make a world.”
- **Identification of pick-up and drop-off locations:** To connect with transportation options, visitors to public spaces must be able to find the appropriate pick-up and drop-off locations. Unfortunately, these are sometimes placed on the edges of large parking lots or around the side of buildings. As a solution, one respondent proposed “braille, large print and audible lists available of drop-off and pick-up spots at parks and entertainment centers for anyone needing them.”
- **Accessible entrances:** Sometimes getting through the door can be the most challenging part of accessing a public space. Several participants indicated a desire for more accessibility of entrances, including accessible door handles or automatic or electronic doors. Multiple respondents specifically mentioned a dislike for revolving doors.
- **Accessibility of ATMs:** Automatic Teller Machines (ATMs) are available in many public spaces, but not all ATMs are consistently accessible for people with disabilities. Independent access to ATMs ensures privacy and provides people with disabilities equal opportunity to access cash in public spaces.
- **Restrooms:** Several respondents described challenges with finding and navigating public restrooms in all parts of their communities. One participant complained, “There is very little

braille anything anywhere. The most annoying, and also easily fixed, is there is never any braille or even tactile signage on restrooms. Even a simple tactile drawing of a man's or woman's figure would suffice."

“ There is never any braille or even tactile signage on restrooms. ”

- **Tactile displays and exhibits:** Historic sites, museums, zoos, public buildings, and many other places often have informational and educational displays for viewing by visitors. Unfortunately, many times there is no tactile alternative for exploration by people with visual impairments. One participant expressed appreciation that “a traveling archeological exhibit was duplicated at a convention center for tactile experience for the visually impaired.”
- **Access to preferred seating:** Preferential seating (based on proximity, lighting, noise-level, etc.) may improve the experience of a person with visual impairment at a restaurant, theater, live event, or other venue. Assistance may be needed to identify a seat, which optimizes access.
- **Availability of interpreters:** For people who are deafblind, the availability of qualified sign-language interpreters is important to enable access in public spaces.
- **Access for people with wheelchair/mobility impairments:** Several respondents reported being wheelchair users or having friends or family members who used wheelchairs for mobility. Accessible communities must ensure public spaces are accessible to people with all types of disabilities.
- **Extent to which the entire space is accessible:** Perhaps most importantly, participants reiterated that accessibility considerations should extend across all parts of a building or public space. If only the common areas of a space are accessible, then people with visual impairments may be denied access to employment or volunteer opportunities or may not have safe access to alternate exits in the event of an emergency.

Independent Navigation in Public Spaces: Most people with vision loss would prefer to navigate public spaces in the same way as people with typical vision—as independently as possible. Factors that determine the extent to which people can navigate a public space independently include:

- **Orientation:** Knowing your location relevant to places and items of interest is very important in public venues. Accessibility of the floor plan is an important factor, with factors including openness, simplicity, and predictability reported as highly desirable for visitors with vision loss. Respondents shared that being familiar with a floor plan can be especially helpful and increase the likelihood of repeat visits to a space; also, floor plans that are arranged in a grid pattern can increase predictability. The availability and accessibility of directions for navigating a space can also help with orientation. Participants reported benefitting from clear verbal directions, braille directories,

“ Knowing your location relevant to places and items of interest is very important in public venues. ”

online directions, text descriptions of floor plans, and push-button access to auditory directories or floor-plan information.

Additionally, within a public space, visitors need to be able to locate the tools and/or supplies relevant to their purposes. A survey participant explained, “[I] have tried [to] work out [at a] gym, however, people move too fast and are always moving my weights. And the spray cleaner for each station is hard to find.” Visitors to a space also need to be able to find entrances, exits, rooms, help desks, exhibits, and other locations of interest; and in unfamiliar spaces, they need to know what their options are. Interestingly, a couple of respondents shared that in their experience, it is sufficient to learn or know just a few relevant locations within a larger space, such as key stores and the food court within a mall or certain areas within a restaurant.

- **Choice:** Several respondents mentioned aspects of choice as relevant to their independent navigation in a public space. People with vision loss prefer the flexibility to choose their own paths and set their own

“ Rather than us having 20 or more wayfinding apps on our devices, one or two that provide accurate information would be better than the wild west situation we have today. ”

schedules when exploring a space. However, sometimes an overabundance of information and choices can be equally frustrating. One survey participant explained, “Rather than us having 20 or more wayfinding apps on our devices, one or two that provide accurate information would be better than the wild west situation we have today.”

- **Hindrances:** A variety of structural and experiential characteristics potentially hinder the ability of a person with vision loss to independently navigate a public space. The level of distracting noise or potential safety concerns can increase stress and decrease confidence in independent orientation and mobility. Underground walkways were reported as particularly difficult for orienting and navigating. Reported physical barriers to navigation include low-hanging signage, narrow aisles, furniture, and queues of people.
- **Supports:** Participants described a range of supportive features in public spaces, including auditory cues like wind chimes and fountains, changing floor textures that indicate intersections or destinations, appropriately placed handrails near ramps and stairs, electronic lifts, and access to human guides. Many respondents suggested that indoor GPS and beacon systems, connected to smartphone apps, should be available in more spaces to improve independent navigation.
- **Size of venue:** The size of a public space is certainly a relevant factor when considering accessibility. Participants reported that indoor navigation supports were most important in larger spaces, while smaller venues were generally easier to navigate.

Other People in a Public Space: The presence and actions of other people in a public space can have a significant impact on the experience of accessibility and livability, whether those people are staff, friends, neighbors, or strangers. Key factors include:

- **Extent to which others are present:** One participant reported that accessibility of a transit station was improved because “there are usually people around if you need assistance.” Another mentioned that restaurants are more accessible because “there are usually many people in close proximity if I need to ask questions.”
- **Extent to which assistance is needed:** While some respondents reported high levels of independence, especially in familiar places, others reported always requiring assistance. One survey respondent wrote, “I do shop, and I do navigate to stores alone, but I always need assistance once at the store because independent navigation is neither successful nor productive for me.” As discussed subsequently, there are both challenges and benefits to having assistance, as well as a range of personal preferences; people with vision loss report preferring to decide for themselves whether to have assistance in the community: “I have had individuals ASK how they could help me and allow me to describe what assistance I need.”
- **Helpfulness of people in the space:** Many of the benefits of having other people in a given space depend upon the extent to which those people are able and willing to be helpful. Language barriers, friendliness, respect for individual differences and preferences, and the ability to give good directions all factor into helpfulness. Additionally, as one person described, people “can be overly helpful or not helpful at all—finding a balance is ideal.” People with vision loss appreciate the ability to obtain “information without being patronized or talked down to.”
- **Extent to which “people know you:”** Participants reported increased access and independence in public spaces where they are known to the staff or others who also frequent that space. This may be one accessibility and livability benefit of smaller communities.
- **Assistance received from friends/family:** Often—whether coincidentally or intentionally—people with vision loss are accompanied by friends and family in public spaces. Some respondents reported a high comfort level with casual assistance from their friends or family, for example, “I rely on my friends to tell me when there is a step or change in the road, or where seating is if I’m in the dark.” In other cases, participants reported wishing there were alternatives but feeling required to impose on a friend or family member, as one participant shared regarding her experience renewing her identification card: “They did not want to assist me with filling out the form; I had to take a friend with me. They would not let me renew online.”
- **Assistance received from public servants (e.g., police):** Often, safety officers and other community officials can provide assistance to the general public, especially in pedestrian areas, parks, and civic venues. However, these officials are not always well-trained or willing to provide meaningful assistance to someone who is visually impaired. One survey respondent expressed, “Policemen should be helping blind people find their way instead of ticketing drivers.”
- **Assistance received from transportation providers:** For a person with vision loss who is traveling independently using rideshare, paratransit, or another such service, the driver is sometimes able to provide some measure of assistance at an individual’s destination, such as connecting the person with a shopping assistant inside of a grocery store.
- **Assistance received from the staff of a venue or business:** Many survey and interview participants commented about assistance received from people employed in public places. This assistance could include guidance for visitors and tourists, offering flexible or accessible seating arrangements, providing directions or an overview of a floor plan, serving as a personal shopper, and/or serving as a human guide. Most importantly, if assistance is needed, then accessibility depends on the extent to which staff are available, reliable, and responsive to

requests for help. For example, a respondent wrote, “Shopping locally is difficult because it’s hard to get reliable help in the stores. Employees are too busy...or give me things that I haven’t asked for in an attempt to get me in and out of the store more quickly.” Because finding staff in a large store can be difficult, people with vision loss may need to be

approached and asked if they need assistance; some survey respondents reported that certain stores required them to phone ahead and schedule a time to shop when assistance would be available, effectively restricting the person’s schedule and opportunities to shop.

“ People with vision loss may need to be approached and asked if they need assistance. ”

The extent to which employees can improve access depends upon each employee’s skills, knowledge, and attitude. Ideally, staff providing assistance are sincere, not overly protective, patient and unrushed, genuinely willing to help, and considerate of individual preferences. Training for employees can improve their abilities to offer meaningful assistance, including knowing the difference between disability and illness, knowing ways to be helpful to people with a range of disabilities, and knowing how to locate and use any accessibility features present in a space (e.g., braille menus or audio description devices). Several respondents were frustrated by shopping assistants and other staff who were unfamiliar with the basic options or items for sale in the space; for example, a “high school male was unfamiliar with granulated sugar” and thus not a very helpful shopping assistant at the grocery store where he was employed. High staff turnover in some places can limit the ability of businesses to train employees and develop relationships to better assist their customers. One survey respondent suggested that assistance could be improved if businesses hired more employees who were blind or visually impaired.

- **Diversity of others in a space:** As previously mentioned, diversity and accessibility can be interconnected. One respondent advocated, “I would suggest implementing more facilities...in a way that would bring people of all walks and challenges together.” Limited accessibility can prevent people with vision loss from enjoying or traveling to new places and can reduce their opportunities for meeting people of different backgrounds and cultures.
- **Challenges posed by others in a space:** While most of the feedback about other people in public spaces was positive and described opportunities for interaction and assistance, there were mentions of challenges created by other people in public spaces. For example, other patrons in a facility could complain or resist the implementation of accessibility features, as one participant shared when community members expressed concerns about adding braille labels to equipment in a fitness center. Additionally, sighted visitors in a space may unwittingly move equipment or personal property of a visitor who is blind or visually impaired, making it almost impossible for the person with vision loss to find his or her items. Furthermore, the volume of other people standing, sitting, or moving around in an enclosed

“ Awareness and common courtesy of members of the general public could go a long way. ”

space can pose challenges for safe and independent navigation. One respondent said, “Often people are very ignorant because they have those fancy headphones and are oblivious to the world.” Awareness and common courtesy of members of the general public could go a long way towards improving access for everyone in busy and crowded spaces.

- **Value of human interaction:** The importance of interaction with other people should not be discounted as a relevant factor in public spaces. One respondent shared, “I shop differently than when I could officially see, but I value the human interaction, so I do it regardless.”

Types of Public Spaces: The factors described in the following list relate to specific places, spaces, and venues in a community. The diversity of locations on this list reflects the wide range of public spaces where people with visual impairment desire equal access in their communities:

- **Stores:** Many participants described their experiences with shopping in their communities, with a variety of reported successes and challenges. In a given store, a shopper with vision loss may need to locate the customer service desk; identify items of interest as well as learn if there are sales or specials; identify item sizes, colors, and prices; locate the checkout area; access the payment processing system (e.g., digital card reader or identifying paper money); and then find an accessible way to transport the purchases home.

Small businesses, grocery stores, and farmers markets were all described as desirable destinations with potential challenges. One person reported, “I am unable to navigate the grocery and unable to shop and gather groceries without assistance.” Factors that hinder access include a store’s concern with style over function in

its arrangement of aisles and displays, as well as narrow aisles and constant rearrangement of items, displays, aisles, and/or other navigational landmarks. Technology offers solutions to assist with shopping in stores, particularly barcode scanning apps that provide varying levels of information about an item.

“ I am unable to navigate the grocery and unable to shop and gather groceries without assistance. ”

Indoor and outdoor malls and shopping centers can also present challenges. An interviewee expressed a desire for a “central point where people can go in the mall to get assistance.” Often people with visual impairments have little information to indicate which store they might be entering within a large mall or row of stores.

In response to challenges with shopping in stores, many participants shared that they only go to certain stores and/or they prefer to shop online. They appreciate stores with accessible websites, although some shared that they are less likely to visit a store in person if they can use the website to place and order, leading them to physically visit only those stores without online options.

- **Medical facilities:** Hospitals, clinics, doctors’ offices, emergency rooms, and other medical facilities are important for all citizens in a community but can present particular challenges to visitors with vision loss. Inaccessibility of paperwork was reported as a major challenge by many participants, as well as challenges with finding offices, exam rooms, and testing

rooms, especially in a large and/or spread-out building or on a medical campus. Sometimes innovations to enhance security, cleanliness, or other important measures in a hospital can decrease accessibility, as one participant reported, when a local medical facility “installed touch-screen door locks on restroom doors, making them inaccessible.”

“ Inaccessibility of paperwork was reported as a major challenge. ”

Hospitals often make use of volunteers to assist visitors and patients with locating rooms and offices; these volunteers must have knowledge and skills for supporting people with vision loss. These volunteers and all hospital and medical staff and managers should take into consideration the needs of people with vision loss, not only as potential patients, but also as potential caregivers, parents, spouses, friends, and visitors.

- **Museums:** Many participants were prompted to provide information about their experiences with accessibility in museums. Likewise, zoos offer similar access challenges as they often provide information

“ There has to be some tactile interaction to make going to museums worthwhile. ”

and exhibits at a distance and rarely in accessible formats. Understandably, audio-interactive and hands-on exhibits were reported as preferable to the typical, hands-off experience of a standard art or history museum. A respondent explained, “One glass case feels just like the next glass case.” Children’s museums often offer this level of access; however, participants appreciated special programming such as touch-tours and other features to enable access to more age-appropriate exhibits. Although audio tours and audio-descriptive devices can increase accessibility in a museum, one respondent explained, “I see no reason to go to a museum to listen to audio description. I could just go to the museum’s website and click on an audio link. There has to be some tactile interaction to make going to museums worthwhile. Consequently, I don’t like going to museums. They are deadly boring.”

- **Libraries:** Respondents shared that public libraries can be excellent resources as long as they provide information in formats that are accessible to people with vision loss. Key, desirable features of concern to participants included assistive technology labs, computers with access to the National Library Service’s Braille and Audio Reading Download (BARD), and text-to-speech software installed on public-access computers.
- **Schools and university campuses:** Though schools and universities might be expected to be highly accessible in order to serve students with disabilities, participants shared that this is not always the case. A high-school aged respondent complained that at her school, “Signage is set up strange where the signs do not correlate to the hallways and are in an inconsistent order.” A university student expressed frustration about the lack of braille signage on restrooms in a university building.
- **Hotels and conference centers:** Guests with vision loss at hotels and conference centers may

experience challenges to accessibility. Study participants expressed particular concern about difficulty with using room keys, and one suggested that in the future, smartphone apps might be employed to offer secure, keyless entry.

- **Parks/green spaces:** Not all accessibility challenges occur in a community's indoor spaces. Parks, amusement parks, swimming areas, community gardens, and playgrounds were all mentioned as areas in which people with vision loss would enjoy greater access. Trails and pathways, particularly circular loops, present particular orientation challenges as they are rarely marked with accessible signage and labels or accurately indicated in GPS maps. Open park spaces provide few navigational landmarks and little advanced warning of random obstacles such as dog waste or running children. Some respondents recommended greater use of beacons in parks, trails, and other outdoor spaces to increase independent access by people with vision loss. One participant also mentioned the importance of playgrounds that are easily accessible by parents with vision loss and that contain accessible playground equipment for children with disabilities.

Parks and green spaces can serve as important destinations for city-dwelling guide dog users whose canine assistants need space to “park” and to let dogs exercise off-leash. Cities can support these guide dog users by increasing access to green space, ensuring rules do not limit or restrict guide dogs in green spaces, and providing adequate access to trash cans necessary for disposal of dog waste.

- **Fitness centers/gymnasiums:** Like parks, fitness centers and gymnasiums provide important spaces for a community's citizens to exercise and socialize. Accessibility challenges in these spaces include navigating locker rooms, setting up equipment, safe and independent use of walking tracks, and accommodations for wheelchairs. Multiple respondents mentioned the benefits and increased access that come from one-on-one fitness training. Others shared that their local facilities offer help with setting up the equipment or are open to labeling/marketing equipment to increase accessibility (many fitness machines are controlled by inaccessible touch screens).

One participant reported attending an especially accessible, adapted center designed with Paralympic athletes in mind, and others described the benefits of working out at a fitness center associated with a hospital or clinic, where the equipment is often more readily usable by people with disabilities.

Whether due to accessibility or personal preference, some participants explained that they simply choose to exercise at home or in other places. Sometimes a fitness center's well-intentioned rules can conflict with equal participation for people with vision loss. A respondent shared that her gym has separate swimming areas for men and women, meaning that she must bring a female companion or assistant to serve as her guide when using the pool. Another participant was asked not to use his cane on the walking track as it might pose a tripping hazard to other walkers/runners.

Yet, several respondents expressed positive perceptions of their experiences with their fitness centers and their willingness to find solutions. One shared, “I use my apartment complex's fitness room, and most of it is quite accessible, except for the treadmills, but I have the basics figured out for those.”

- **Restaurants:** Several questions in the study prompted participants to share their preferences

and experiences related to restaurants in their communities. Menu accessibility was one of the most oft-mentioned concerns; however increased access to menus online may be offering a solution to restaurant goers with technology skills. Restaurant buffets may pose particular challenges for independent access, although surprisingly one respondent reported a preference for buffets as long as friends or family members were available to provide sighted assistance. In fast-food restaurants, self-serve soda machines are rarely accessible and almost always require sighted assistance to ensure the desired flavor or beverage is dispensed. As with other venues, the helpfulness of staff at restaurants can be key, enabling diners with visual impairments to access menu information or identify a preferred or quiet corner booth to make their meal more enjoyable.

- **Airports:** Air travelers with visual impairments or blindness may face obstacles to independent access in their departure or destination airports. Arrival and departure information is often displayed on overhead television monitors with no braille or auditory option (other than asking for sighted assistance). Several respondents reported appreciating or desiring access to GPS and/or beacon information in airports to support independent orientation and mobility.
- **Stadiums/seated venues:** Whether attending concerts, movies, or sporting events, stadiums, theaters, and other seated venues often present accessibility challenges for attendees who are blind or visually impaired. Negotiating narrow aisles, identifying an assigned seat, and carrying food from concession stands can be so daunting that one participant reported feeling “stuck in her seat” as it would be too difficult to try to negotiate the aisles, steps, and busy spaces of the surrounding venue. Another participant reported that the small size of the seats made for an uncomfortable experience; likewise, securing a seat with adequate room for an accompanying guide dogs can be difficult.

While cinemas and theaters increasingly have audio description devices for use by guests with vision loss, other information in the venue may remain inaccessible. For example, a participant wrote about the need for “a better system of finding out what’s playing at the movie theaters,” since this information is most often displayed on overhead marquees and signs at the cinema entrance.

Athletic events may pose unique challenges, from pop-fly balls to treacherous bleachers. Nevertheless, many respondents described having attended ball games and sporting events. Many reported the great benefit of access to a live-stream radio announcer’s play-by-play description of the game, enabling them to follow along without additional sighted assistance. However, this simple accommodation is most effective if there is a highly descriptive radio announcer, access to quality audio, and no substantial delay between the live action and the audio description. One participant reported no longer enjoying listening to the radio announcer while at the ball park because the station instituted a 20-second delay of their live-streamed broadcast.

- **Government buildings:** Like all citizens, community members with disabilities have need of forms, licenses, and/or other services obtained in government buildings such as city halls, post offices, and court houses. Increasingly, forms and processes can be completed online, improving access for people with vision loss as long as the online services are accessible and the people with vision loss possess the necessary technology and skills.

For those who enter government buildings in person, they frequently encounter the “take a number” machines designed to automate the processing of visitor needs without requiring everyone to stand in lines. Unfortunately, these “take a number” systems usually rely on a

printed ticket and inaccessible visual displays. Once they have been called upon to be served, additional accessibility challenges may arise, including fingerprinting, proof of disability, paperwork and required documentation, and so on. Like all citizens, people with vision loss may be frustrated by the complicated process, expense, limited hours, and extreme wait times. However, these factors are especially difficult for people with vision loss who may be on tight schedules due to the need for transportation and may have limited access to instructions or supporting information such as forms to apply for disability-related subsidies.

Other challenges with government buildings and processes include the provision of reminders and other printed information via the mail and questions about a person's right to wear sunglasses in identification photos. A respondent reported that his state has tried to reduce the hassle for people to renew identification cards by issuing cards that do not expire; unfortunately, these cards without expiration dates have caused unexpected hassles with airport security and other officials who expect to see expiration dates on licenses and identification cards.

Finally, two additional, specific types of government venues were noted by study participants: offices that provide community services (e.g., vocational rehabilitation) and designated voting precincts. Communities must ensure equal access and full participation in these venues so that citizens with vision loss can access important services and exercise their voting rights.

- **Workplaces:** Although this study did not focus on employment barriers, multiple participants noted the importance of accessible workplaces, including physical structures as well as workplace technologies and employer attitudes. Any of the public spaces described in this section could be potential workplaces for people with vision loss and thus must be equally accessible not just for patrons and visitors, but also for all levels of staff.
- **And more...** While the list of important community spaces is practically infinite, the following are additional, specific venues and spaces mentioned in participants' survey and interview responses: casinos, cruise ships, bowling alleys, bus stations, churches, historic buildings/sites, law offices, assisted living facilities, and senior centers.

Transportation in the Community

Transportation within a community is key to enabling access to all public spaces, employment opportunities, social activities, and more. This section begins with a list of reported types of transportation used by people with vision loss in various communities and a list of the reasons people reported needing transportation, followed by important accessibility and livability concerns that are relevant to one or more types of transportation.

- **Types of transportation:** Following is a list of all of the categories of transportation services and modes mentioned by survey and interview participants. As some respondents seemed to have differing definitions for the terms they used to label or describe different types of transportation, this list does not include details or explanations:
 - Paratransit (including on-demand paratransit)
 - Dial-A-Ride and other on-demand services
 - Air travel
 - Bicycle
 - Buses (including door-to-door and fixed-route)
 - Cars driven by friends/relatives

- Cars driven by the respondents
 - Cars driven by paid drivers
 - Carpools and vanpools
 - Door-to-door service
 - Ferries
 - Handi-ride
 - Light rail
 - Mass transit
 - Medical transportation
 - Park-and-ride services
 - Prescheduled ride services
 - Rail/trains
 - Rideshare
 - Ride-hailing services such as Uber and Lyft
 - Rural transit services
 - Shared ride services
 - Street cars
 - Subways
 - Taxis/cabs
 - Volunteer driver services
- **Reasons for travel:** Communities considering accessibility and livability for people with vision loss must take into account the wide range of reasons people need to travel. The following were shared by survey and interview respondents:
 - To and from shopping, including grocery stores, pharmacies, and multi-store shopping centers
 - To and from work, including shift work
 - To and from town, larger cities, and neighboring cities
 - To and from the library
 - To and from school and on school field trips
 - To and from the airport
 - To and from entertainment, parks, and walking paths
 - To and from places to eat
 - To and from public services
 - **Scheduling/requesting a ride:** For many people with vision loss, the first step in getting to a desired destination is scheduling or requesting a ride through a transportation service provider. The ease or complexity of this process significantly impacts the usability of the service. While online scheduling may be ideal for some riders, others report appreciating the ability to schedule or request services over the phone.
 - **Waiting for a ride:** Whether waiting for a city bus or for a pre-scheduled door-to-door paratransit ride, the length and conditions of the waiting experience can impact a service's usability. Riders appreciate clear communication from service providers about any anticipated delays to avoid unnecessary waiting for a ride that is running late. When waiting out of doors, participants reported the importance of benches and shelter, which not only make the waiting experience more comfortable, but also help alert fixed-route drivers that there is someone at the stop who may want to board their bus. Having to wait for extended time in excessive heat or cold can be frustrating as well as potentially hazardous to a rider's health.

- **Boarding/hailing/entering a vehicle:** Participants described a variety of accessibility challenges and concerns related to initiating a ride with a transit provider, whether a taxi, bus, Uber, or other service. Bus stops are often difficult to locate and rarely have tactile signage so that the rider can confirm that he or she is at the right spot for the correct bus route. Some paratransit systems that do not offer door-to-door service require riders to meet their vans or buses at specific street corners or curbs, which can be problematic for riders who cannot see the vehicle or find the precise pick-up location. For on-demand or scheduled services, drivers may not call, honk, or otherwise alert a visually impaired person that they have arrived, leading to unnecessary delay or missed rides. Upon entering a public bus, riders are faced with challenges of various payment methods ranging from cash to tokens to fare cards, many of which are inaccessible. One participant expressed, “I should not have to show ID and cash fare before I board the city buses, especially in dangerous areas where people will take advantage of a person with a disability.”

- **Riding conditions:**

Once onboard, people with vision loss report a range of accessible and inaccessible riding experiences.

Air conditioning is an important feature, especially in summer

months and warm climates. Also, a large number of other people in a train car, bus, or van can make the ride uncomfortable and maneuvering difficult; additionally, numerous passengers sharing a ride may mean that the vehicle will follow a lengthy route and make numerous stops before arriving at an individual’s destination.

“ People with vision loss report a range of accessible and inaccessible riding experiences. ”

Respondents reported that rules for public behavior (e.g., prohibitions of smoking and drinking) improve the riding experience as long as they are enforced. Well-maintained vehicles (e.g., good shock absorbers on buses) and safe and courteous drivers (e.g., ones who wait for passengers to sit down before moving) also improve the riding experience and make public transportation more enjoyable for those who depend on it.

An interesting psychosocial aspect of a transit experience is the extent to which riders view it as typical versus stigmatizing. One survey respondent remarked, “I would improve the paratransit service, setting up subcontract agreements with cab companies and/or ride-sharing services. I am blind, and I find it embarrassing to arrive to a professional appointment in a large vehicle which beeps as it moves in reverse.”

- **Leaving/exiting a vehicle:** Participants discussed a few accessibility aspects of exiting a transit service upon arriving at a destination. Bus riders need to be certain they exit the vehicle at the correct stop and appreciate automated alerts or alerts from the driver. One respondent suggested that bus systems should offer the ability to request an on-route stop at the time that a rider boards the bus, thus ensuring that the bus driver stops at the appropriate location.
- **Transferring:** Many riders need to transfer from one route or line to another or to switch from one method of transportation to another in order to reach their destinations. Ideally, systems should be designed to decrease the number of transfers necessary and to make necessary transfers easier and more efficient. A participant wrote, “Bus transfers [should] make more

sense. In other words, to transfer from one bus to another, you [should] not have to cross two major intersections.”

- **Information systems that support transit:** As with public spaces and most every other aspect of a community, accessible, livable transportation systems must include accessible information systems. Technology innovations like GPS on bus routes and QR codes to enable quicker access to bus timetables have the potential to improve access for some riders, but many more changes may be needed, particularly in older systems. Features requested by survey and interview participants include:
 - Clear, sufficiently loud, accurate, functioning, automated announcements on buses, trains, subways, and so on and in stations and terminals
 - Beacons at bus stops and in large stations and terminals
 - Up-to-date, accurate signage in braille and other accessible formats in taxis, on buses, at bus stops, and in stations and terminals (including on elevators and escalators)
 - Systems to enable information to be accessed over the phone, through apps, and through websites, including accessible apps/websites for trip planning
 - Accessible dissemination of accurate, timely, reliable information about changes to routes or stops
 - Accurate, up-to-date information synced with wayfinding apps and other tools, such as online maps
- **System policies:** The rules and policies that structure a community’s transportation system(s) may hinder or help with accessibility for people with vision loss. Training of staff and accommodations for wheelchairs and people with multiple disabilities can have positive impacts. However, many policies result in limitations to access for riders with vision loss, including: limitations to companion co-riders on paratransit; age restrictions limiting services only to riders of certain ages; restrictions against traveling with children; prioritization of rides for medical needs; and charges for pre-scheduled rides even when system delays resulted in the passenger being dropped off too late for his or her appointment. Reconsideration of such policies may help to shape systems that are easier to use and provide greater access across communities.
- **Other features of the system:** Transportation systems vary widely across the United States. In their own words, following are additional factors mentioned by participants as key to the accessibility and usability of transit services in their communities:
 - **Hub-and-spoke systems:** “The subway, Metro Rail, is a hub-spoke system. This means that to cross the city or go from one suburb to another, you must take the rail downtown and then out of town. Alternatively, you can take long circuitous bus routes across the suburbs.”
 - **Frequency of buses/trains:** Dozens of participants replied that if they had the power to make changes to improve their community’s accessibility, they would increase the frequency of buses and/or trains.
 - **Timeliness/on schedule:** “We do have a paratransit line, but it only runs when the regular bus line runs, and they are known for being unreliable for pick up times.”

“ Many policies result in limitations to access for riders with vision loss. ”

- **Geographic limitations:** "...have rides that go into different counties, not just to the county line."
- **Route limitations/ensuring important destinations are reachable:** "[The] Department of Motor Vehicle office [is] not located on a major bus line or close to a train station."
- **Time limitations and advanced scheduling requirements:** "The public transportation we have is a bus or van that can take you to places in the county, but only during particular parts of the day and by appointment. To book a ride out of county, it has to be done literally three months or more in advance and can only be to places like the doctor."

Pedestrian Experiences in the Community

When not accessing the transportation system, people with vision loss are typically on foot (or in wheelchairs), experiencing many parts of their communities as pedestrians. The following factors relate to the walkability of a community and thus directly impact the accessibility and livability experience for residents and visitors with vision loss:

- **Accessibility of walkways:** A community's system of roadways must be accompanied by an accessible system of pathways for pedestrians to maximize accessibility and livability for people with vision loss. Sidewalks are perhaps the most important pedestrian paths (they were certainly the most mentioned in this study), although communities do not always ensure that sidewalks are sufficient and useful. Survey and interview participants advocated for sidewalks on both sides of every street as well as sidewalks connecting streets to the entrances of shops and businesses (not requiring pedestrians to navigate through parking lots to reach their destinations). Broken, cracked sidewalks or those that hold water must be repaired, and pedestrians should be provided with clear and easy means of reporting sidewalks in need of repair and requesting new sidewalks wherever needed. Ideally, sidewalks should be "broad enough to accommodate two wheelchairs side by side," shared one participant, and others mentioned the need for sidewalks to have curbs that are steep enough to be noticed but not so high as to require steps or be otherwise dangerous. Sidewalks should also be safely separated from roadways wherever possible.

“ Sidewalks are perhaps the most important pedestrian paths. ”

Communities must be aware of and seek to reduce obstacles in sidewalks and other pathways. The survey participants and interviewees described a host of potential obstacles, including plants and debris, flowerbeds, garbage cans, bushes and trees, poles, potholes, unshoveled snow, shoveled snow, streetlights, and (according to one participant) homeless people. Bike paths may provide additional access for pedestrians as long as rules about safety and sharing space are enforced (bicyclists on sidewalks must also follow rules to safely avoid colliding with pedestrians). Additionally, drainage and storm sewage systems must be maintained and improved to prevent ditches and run-off from flooding into pedestrian paths.

- **Traffic and intersection concerns:** Along with walkways, intersections where pedestrians encounter traffic can pose significant challenges. Smaller towns and less walkable communities may have few or no lighted or marked intersections for safe street crossing by pedestrians. Where these intersections exist, their characteristics can help or hinder pedestrians who are blind or visually impaired. At a minimum, lighted intersections with pedestrian crossings should

provide enough time for pedestrians to safely cross the given street. For people with low vision, the visual signal should be operational and high-contrast. For people who cannot use visual information to cross the street, audible pedestrian signals (APSs) should be installed to provide the pedestrian with clear information about when it is safe to cross.

Respondents described a variety of aspects of APS devices that make them more or less helpful. The button on the APS should be easily located in a standard position at the intersection and at a height that can be reached by someone in a wheelchair; locator tones can be useful for pedestrians trying to find the APS button. For people who are deafblind, the signal should provide haptic or tactile information in addition to the auditory feedback. Some respondents prefer speaking rather than chirping/beeping signals (especially speaking the name of the street to be crossed), some desire APSs that are subtler and less intrusive to others in the area, and several respondents reported a desire for uniformity or standardization of APSs within a community.

In addition to APSs at intersections, pedestrians with vision loss need curb cuts that are well-marked and steep enough to clearly indicate that the person is stepping into a street or parking lot. Truncated domes/detectable warning systems literally place tactile indications under foot for pedestrians to signal that they are approaching a crossing or intersection. Access and safety are increased when curb cuts and other indicators are aligned to direct pedestrians directly across a street and up the curb cut onto the sidewalk on the opposite side; unfortunately, many of these curb cuts and indicators do not provide sufficient direction or, even worse, point pedestrians directly into the middle of intersections.

Communities can improve the accessibility of intersections by repairing faded crosswalks to provide higher contrast of painted markings. It is also important to maintain and calibrate crosswalk signal systems to ensure they are functioning, so that a traveler is not left wondering if a signal is ever going to change and/or if he or she should proceed without waiting for the signal. Maintenance crews should be instructed not to plow snow or pile any construction debris into the crosswalks or medians that pedestrians use to navigate intersections.

City planners can consider skywalks and pedestrian over- or underpasses that eliminate pedestrian traffic in dangerous intersections, and communities can seek out and quickly respond to pedestrian feedback about needed APSs, problems with intersections, and other concerns. Planners should reconsider or plan very carefully in the newly popular plazas and cityscapes where roadways and sidewalks merge into shared-use paths and there are few curbs to delineate safe pedestrian walkways for people with vision loss. Survey and interview participants shared that five-street intersections, fast-moving traffic, and roundabouts can be especially challenging, and so special care should be taken to consider ways to facilitate safe crossing for pedestrians.

Finally, communities must educate drivers and enforce traffic laws with respect to pedestrians, white canes, and intersections. Certain traffic rules and designs, such as right-turns on red, flashing yellow lights, and right turns on green arrows, can make street crossings particularly difficult for pedestrians who are listening for sounds of moving traffic to determine if it is safe to cross a street. In these cases, drivers must be alert to pedestrians, especially those carrying white canes.

- **Signage and maps:** Sighted pedestrians often rely on street signs and maps to determine their routes through a community, and pedestrians with vision loss can obtain similar benefits if

these signs and maps are made available in alternate formats. One respondent applauded her community's "accessible municipal braille and talking maps," which provide pedestrians with visual impairments important information for planning their routes.

- **Alertness/awareness of construction and obstacles:** One survey respondent suggested that communities "implement a notification-based service that would provide notifications to individuals customized based on one's personal needs. Examples include traffic and construction obstructions during walks around the city." Alerting pedestrians with vision loss to obstacles before they meet those obstacles face to face can save them time and improves their safety.
- **Construction areas:** In addition to being alerted to construction projects that impact pedestrian walkways, people with vision loss need construction areas to be safer and easier to negotiate.
- **Parking lots:** Parking lots were the subject of many complaints from survey and interview participants. While these lots provide access for car-driving visitors to shops and businesses, they often form vast, dangerous "no-man's-lands" between sidewalks or bus stops and the desired destinations for people with vision loss. One respondent explained, "The bus, in some cases, does not take you directly to the building; rather, the buses take us somewhat close, but we, as blind individuals, will still need to go through very complex and huge parking lots just to get to the building."
- **Safety of area:** In some cases, people with vision loss need to travel into or through neighborhoods with high levels of crime or other dangers. As pedestrians with disabilities, safety concerns may reduce their ability to travel these areas independently.

“ People with vision loss need construction areas to be safer. ”

Housing

In addition to access within and between public spaces, people with vision loss need accessible, livable housing in order to fully enjoy living in a community. The following are important, interconnected considerations with respect to housing:

- **Availability in accessible parts of town:** People with vision loss may have strong preferences or even requirements for their housing needs depending on transportation and employment options in their community. A community's accessibility is partially determined by the extent to which accessible rental housing and home-ownership opportunities are available for rent/purchase in the locations that are accessible and livable for community members with vision loss. One respondent clearly outlined the connection between housing and community accessibility, explaining, "I checked transportation to local stores where I would need to shop and moved to a place where I can walk to what I want or use good public transportation to get there. Transportation figured into my decision of where to precisely live."
- **Affordability:** For many people with vision loss living on limited incomes, including older people with vision loss who may be retired, housing opportunities must be affordable. Rising property taxes also impact community residents with vision loss and may cause them to be forced out or priced out of neighborhoods that would be most accessible and livable.

- **Accessible home appliances and services:** In rental housing and in housing for sale, the installation of accessible appliances can have positive impacts on quality and efficiency of the daily lives of people with vision loss. People living on limited incomes may be unable to afford new appliances, so having accessible appliances already in place is especially helpful. Similarly, the accessibility of locally available Internet and television services also makes life less difficult and potentially more enjoyable for community residents with vision loss.
- **Handyman services in remote areas:** One participant who lives on a remote island reflected on the importance of handyman (home repair and maintenance) services to people who are blind or visually impaired who may not have accessible means for doing their own home repairs. Service providers such as home maintenance technicians can play an important role in making a community accessible and livable.

B. Values and Preferences of Community Members with Vision Loss

The previous sections have described aspects of communities' infrastructure, housing, businesses, programs, and services that facilitate or inhibit accessibility for residents with vision loss. This segment looks at themes among the values and preferences shared by survey and interview respondents, highlighting some of the most important concepts for approaching community-wide planning of accessibility and livability.

- **Accessibility:** People who are blind or visually impaired want to know that accessibility is a priority and commitment in their communities, and that the community intentionally makes efforts to be accessible.
- **Autonomy:** People with vision loss desire the opportunity to make the same daily decisions as anyone else—the ability to go where they want to go, when they want to go, with or without assistance, whether to fulfill a “want” or a “need.” They desire the same rights to privacy and freedom from intruding on others, and they enjoy the opportunity to select their preferred solutions from a range of available options (rather than being prescribed a single solution based upon disability or other factors). One respondent mentioned the desire to be able to take a spur-of-the-moment trip



“ The ability to go where they want to go, when they want to go, with or without assistance, whether to fulfill a “want” or a “need”. ”

to get ice cream, rather than being beholden to the strict schedules and limited destinations of her community's paratransit system. Another participant was pleased to report, "I have bus transportation from my home to the downtown area until after midnight each day. I can take a bus to town and walk over a bridge to take in a major league baseball game and if I wanted to spend that much money, I could do the same with football. I can get to theaters for plays on public transportation, but I can also use Uber or paratransit if they fit my needs better."

- **Community collaboration:** Participants report positively about efforts of community leaders to work closely with community members to improve accessibility and livability. One person remarked, "The city has worked closely with the community to [make] accessibility a priority with the transportation system." Another said, "Street crossings are becoming more and more accessible; traffic engineers are working with orientation and mobility specialists and have a greater awareness of such needs."
- **Free programs/services:** "Free" is always good! Participants shared that some communities have been able to provide Dial-A-Ride and other pre-scheduled transportation services at no cost to people with disabilities.
- **Anticipated/actualized improvements:** Several participants responded positively and optimistically to accessibility and livability in their communities. One person observed that a "City recently adopted a complete streets policy which may help in the future;" another looked forward to "promises of improved theater accessibility."
- **Negatives (non-values):** In contrast to the positive values just described, a separate list of themes emerged to describe negative characteristics of communities/programs/services/systems that inhibited accessibility and livability. Examples of these themes included:
 - **Expense:** "I don't use public transportation because cabs are too expensive and to get to a bus I have to cross a busy intersection which I can't navigate because of a hearing impairment."
 - **Discomfort:** "Curb cutouts and tactile sidewalk tiles are needed; I'm afraid to walk around."
 - **Inaccessibility:** "The ADA is completely ignored until you threaten to take action."
 - **Lack of services:** "Living out in the country and [in a] tiny town of 45, we don't have much services at all."
 - **Work left incomplete/more to be done:** "There are various ways to get around, and most buildings are accessible. However, the streets, sidewalks, APS, and curb cuts could use improvements."
 - **Undesirable/ineffective systems:** "Some buildings are older, transportation could be better. We are always behind other cities."
 - **Reduced quality over time:** "The state of transportation is, especially after recent changes, more than a little disgraceful. Even the transit agency...doesn't know where some of their new routes go."

C. Diverse Characteristics of Individuals with Vision Loss

The vast diversity of the population must be taken into account when considering all of the previously mentioned aspects of community livability and accessibility as well as the values and priorities of people with vision loss. The following elements of diversity were evident in the thoughts shared by survey and interview participants:



- **Age:** Vision loss impacts people of all ages. Some programs and services are designed to benefit specific age groups (school children, working-age people, retirees and senior citizens), therefore, community accessibility may be experienced and perceived differently by different residents.
- **Level of awareness of available services:** When asked if the local transit service provided access to necessary shopping areas, one respondent replied, “I don’t know if the public bus does.” Thus, some members of a community may be familiar with certain public services, while others may be totally unaware. The onset of vision loss may require a resident to gain knowledge about never-before-used programs and systems to regain maximum independence and access to the community.
- **Dispositions:** Different life experiences, cultural backgrounds, and personality traits mean that everyone experiences the continuums of accessibility and livability differently. Examples of these dispositions include individual levels of adaptability to change as well as individual perceptions of the importance of not being disruptive or bothering others.
- **Presence of other disabilities/health factors:** Several survey and interview respondents reported having additional disabilities beyond blindness or visual impairment. The presence of hearing loss and/or use of a wheelchair for mobility can dramatically impact what accessibility features are most important to an individual’s independence in a given community.
- **Recency of onset of vision loss:** One interviewee spoke about the psychological impacts of adjusting to vision loss, which may make the experiences of people who are newly visually impaired different from the experiences of those who have had more time to adjust.
- **Skills and abilities:** Differences in educational backgrounds and the recency of onset of vision loss lead to a diversity of knowledge and skills among individuals who are adapting to vision loss. Abilities may vary widely in individuals’ orientation and mobility skills and training, in their self-advocacy and social skills, in their abilities to remember complex directions, and in their knowledge of ways to address accessibility concerns with community officials.
- **Responsibility for childcare:** Plans for community accessibility may overlook the possibility that a resident or visitor with visual impairment could be pushing a stroller, accessing daycare, or visiting playgroups. One participant wrote, “[I] cannot shop independently because [I] cannot

get there while caring for my family (transportation doesn't imagine that a disabled person could have young kids)."

- **Technology:** In addition to various levels of knowledge and skill with technology, people with visual impairments vary in the technologies they prefer, own, and can afford. While some respondents described using a variety of apps to support their daily commutes and information access, others strongly preferred to use the telephone for scheduling transportation, accessing train tables, and so on.
- **Use of dog guide:** For some people who are blind or visually impaired, a guide dog provides an invaluable support for independent navigation, while many others navigate with human assistance, using only a white cane, or with other techniques. When a person travels with a guide dog, accessibility considerations may change, such as the need for access to public green spaces or the need for more space for the dog to sit or walk.



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